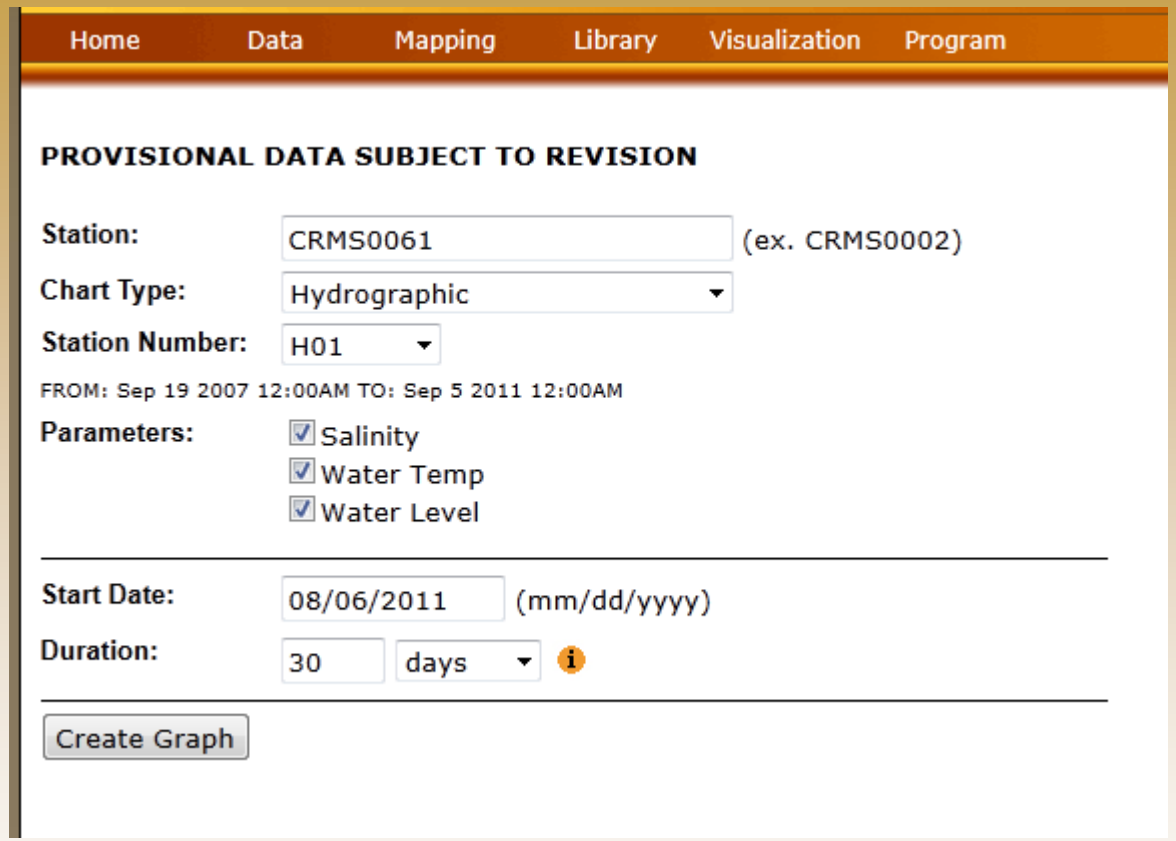
CRMS Website Roadshow

February and March 2013

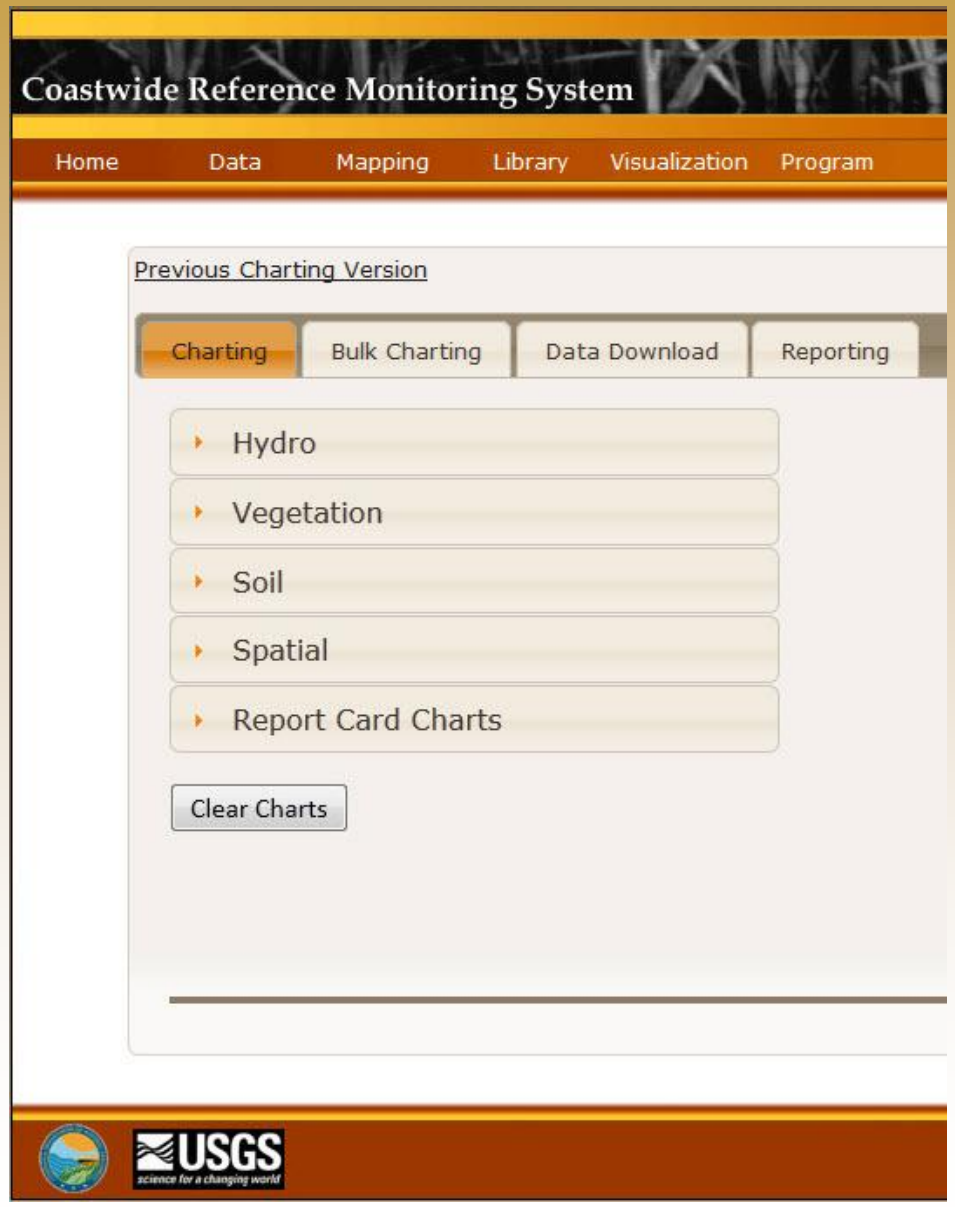
Data/Visualization

- **Released to Production**
  - Bulk Data Download
  - New Charting Interface
  - Bulk Charting Tool
  - Reporting
- **Staged**
  - Multi-Site Plot Hydro index chart
  - Map based Station picker for multi station lists in charting and bulk data tool.

Charting: Old Interface



Remember me?



Data/Visualization

Charting:
- Individual charts
- Site, multi-station, project

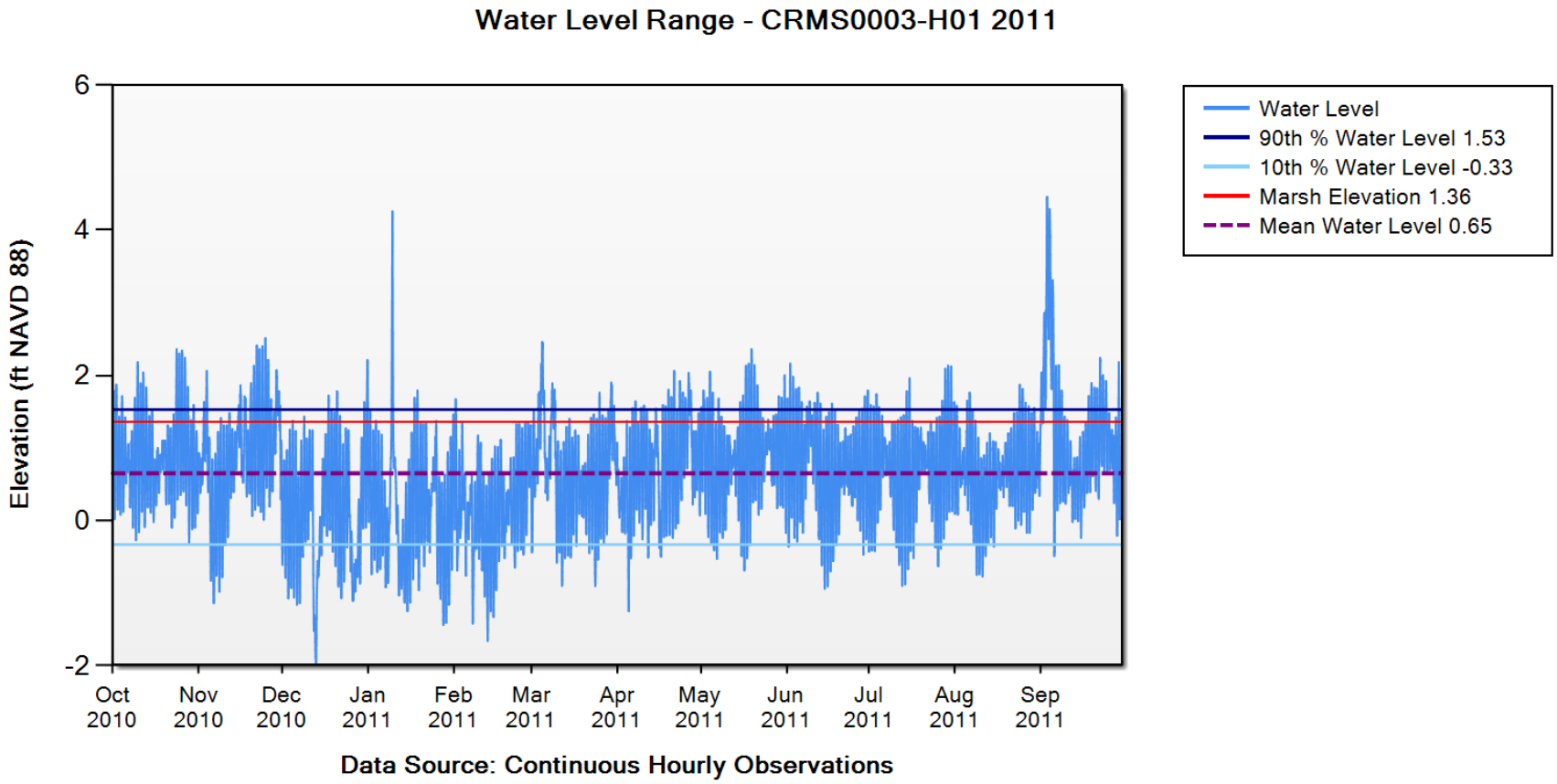
Bulk Charting:
- Generate & download sets of charts (with custom colors where appropriate)

Data Download:
- Download derived values

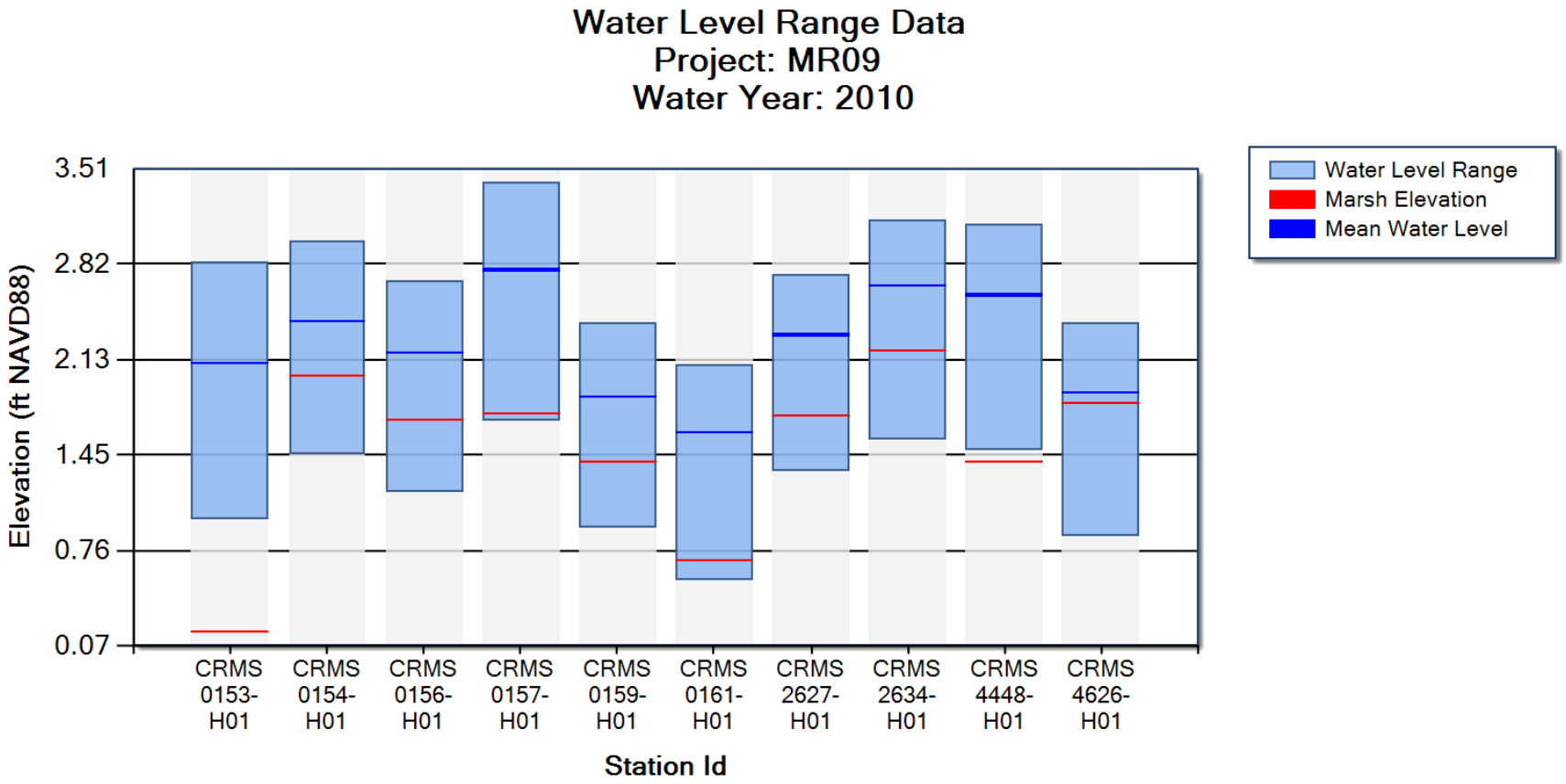
Reporting:
- CRMS report cards (multi-scale)
- OM&M reports coming soon

New Charts

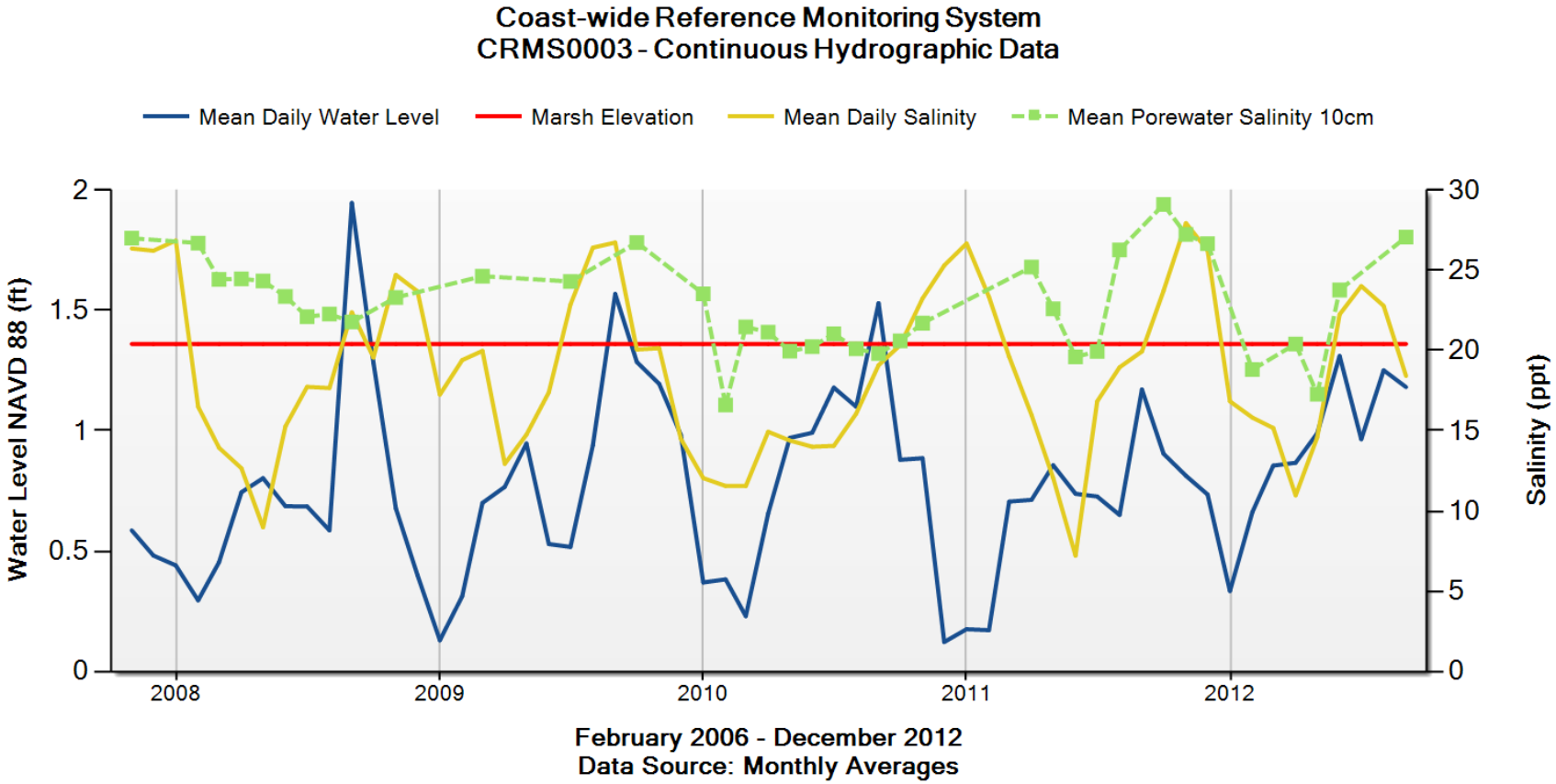
Station Water Level Range



Project Water Level Range



Continuous Hydro



Charting-Hydro: Multi-Station Example

limited to 10 stations

Previous Charting Version

Charting | Bulk Charting | Data Download | Reporting

- Hydro
  - Water Level Range
  - Hydro Completeness
  - Salinity
  - Water Level
  - Temperature
  - Continuous
  - Site Hydro Index
  - Soil Porewater
  - Precipitation
  - Interactive Hydro
- Vegetation
- Soil
- Spatial
- Report Card Charts

Clear Charts

Water Year is October 1 - September 30

Scale: Multi Station

Date Range:
2/25/1987 - 12/19/2012

Min Date: 2/25/1987

Max Date: 12/19/2012

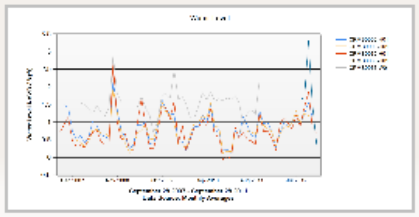
Apply Date Filter

Basin: All Basins Project: All Projects

Selection limited to 10 items.

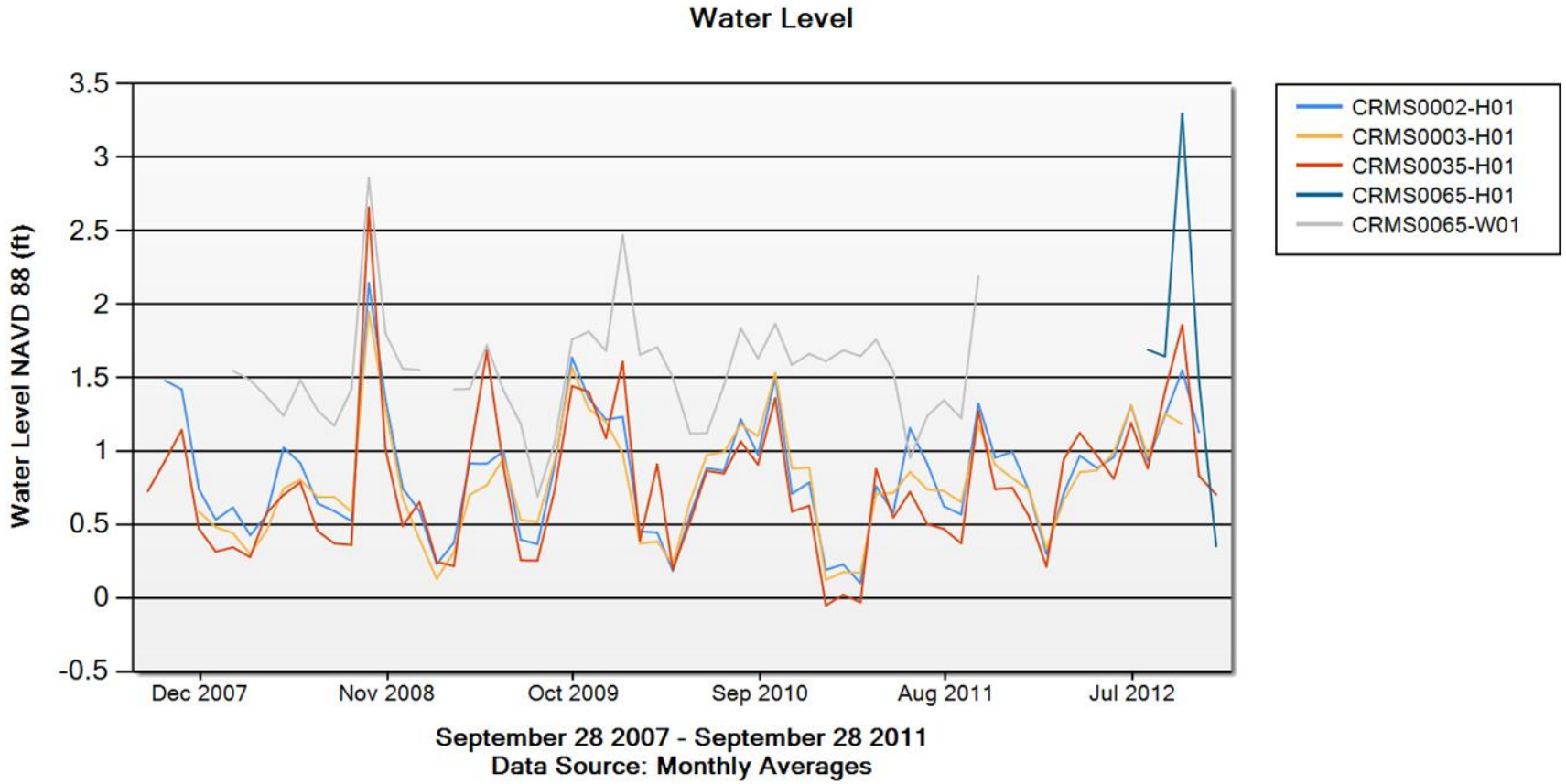
AT04-01	CRMS0002-H01
AT04-02	CRMS0003-H01
AT04-03	CRMS0035-H01
AT04-04	CRMS0065-H01
AT04-06	CRMS0065-W01
BA01-01	
BA01-02	
BA01-03	

Submit Request



Charting-Hydro: Multi-Station Example

limited to 10 stations



Charting-Hydro: Interactive Hydro

Coastwide Reference Monitoring System

a CWPPRA funded project

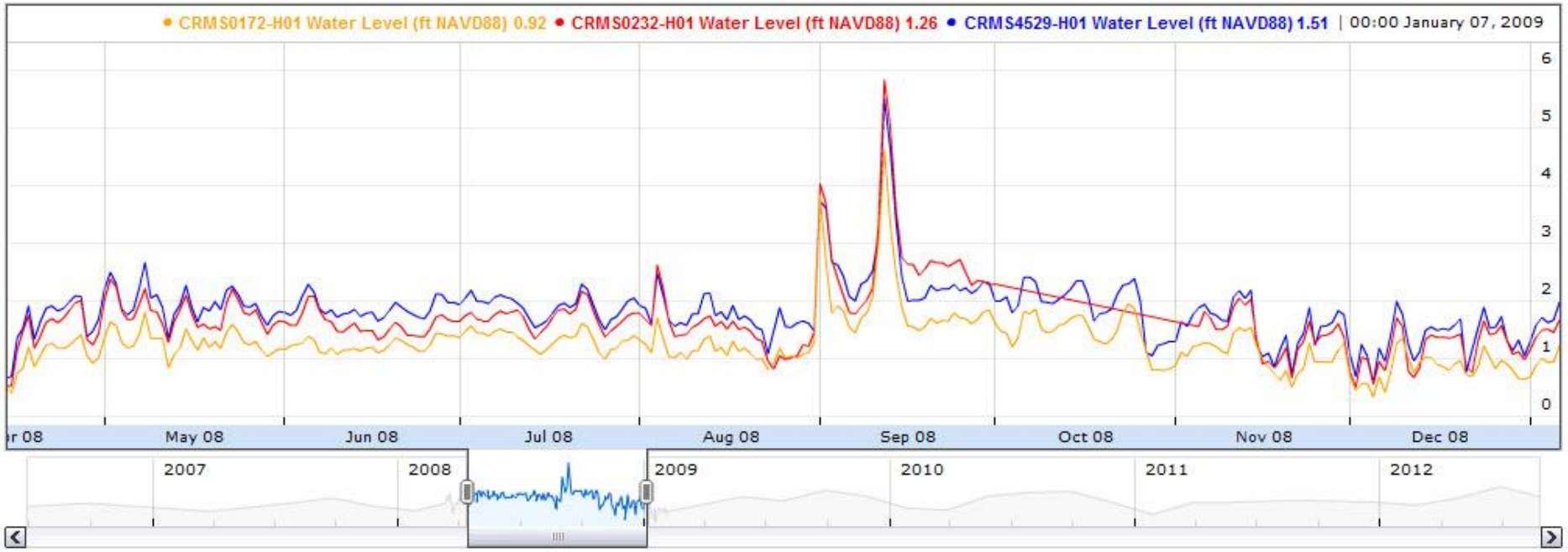
Home | Data | Mapping | Library | Visualization | Program

CRMS0232-H01 | Water Level | Red

CRMS4529-H01 | Water Level | Blue

CRMS0172-H01 | Water Level | Orange

Submit



Charting-Hydro: Interactive Hydro

Coastwide Reference Monitoring System

a CWPPRA funded project

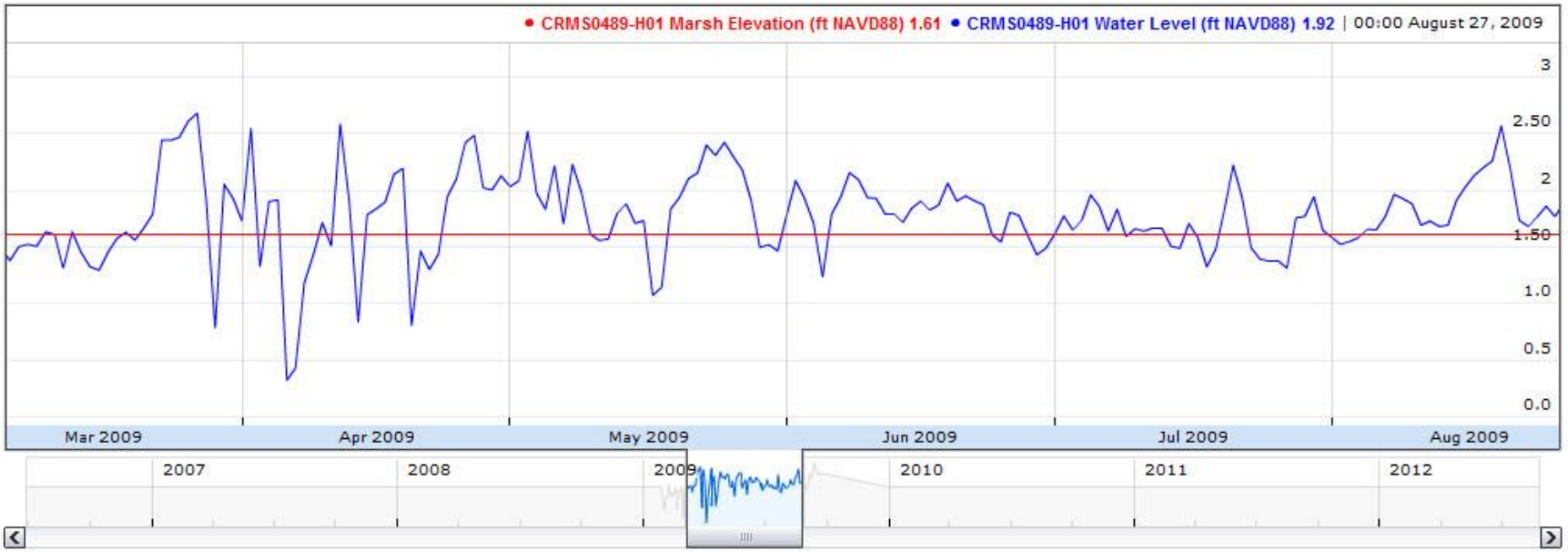
Home | Data | Mapping | Library | Visualization | Program

CRMS0489-H01 | Water Level | Blue

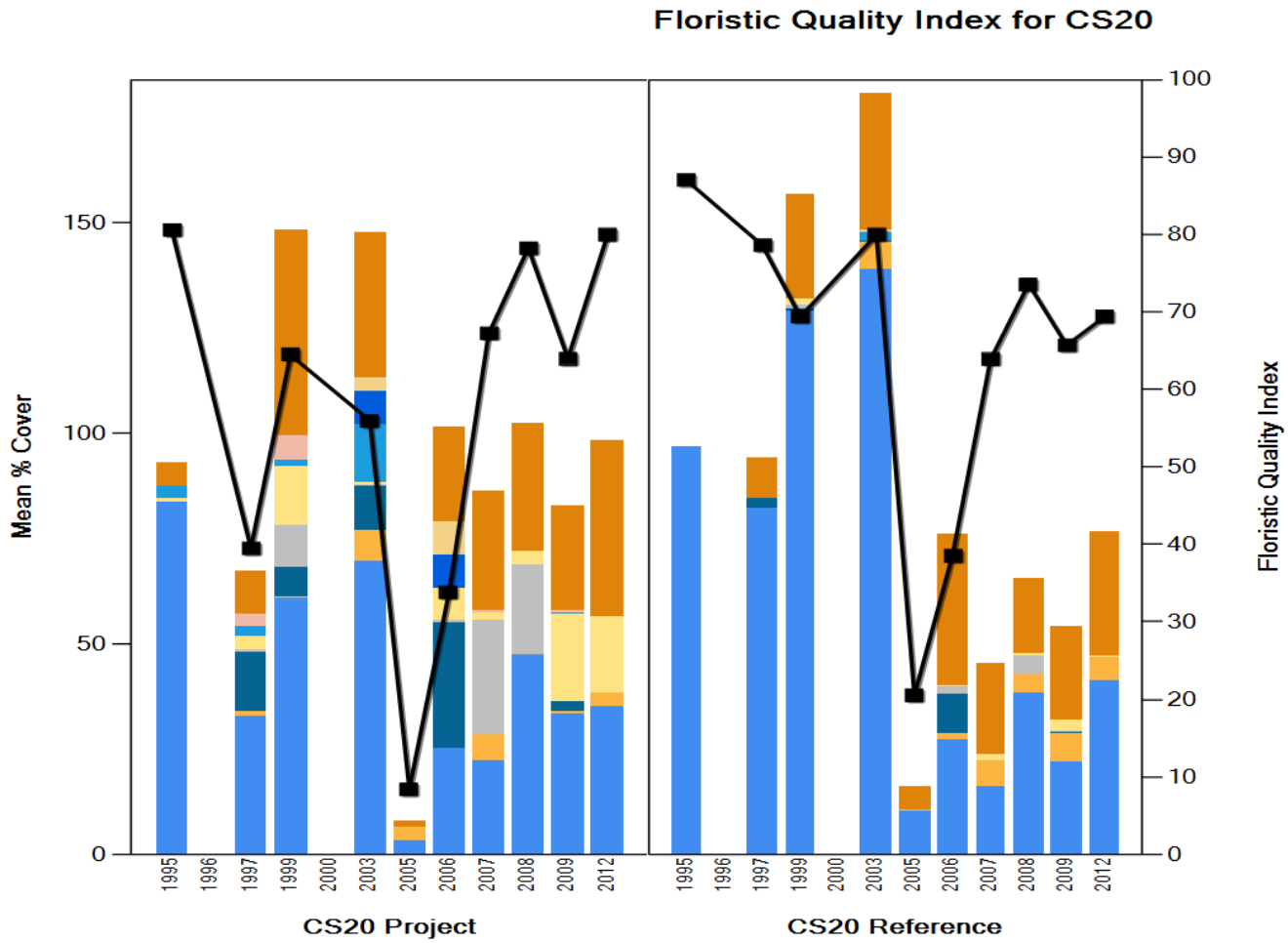
CRMS0489-H01 | Marsh Elevation | Red

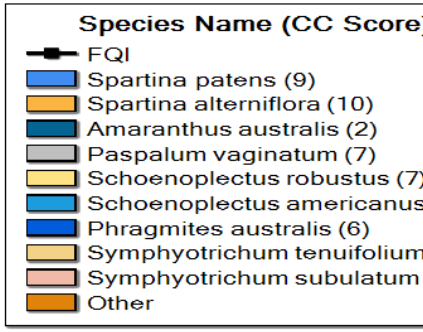
None | Water Temperature | Orange

Submit

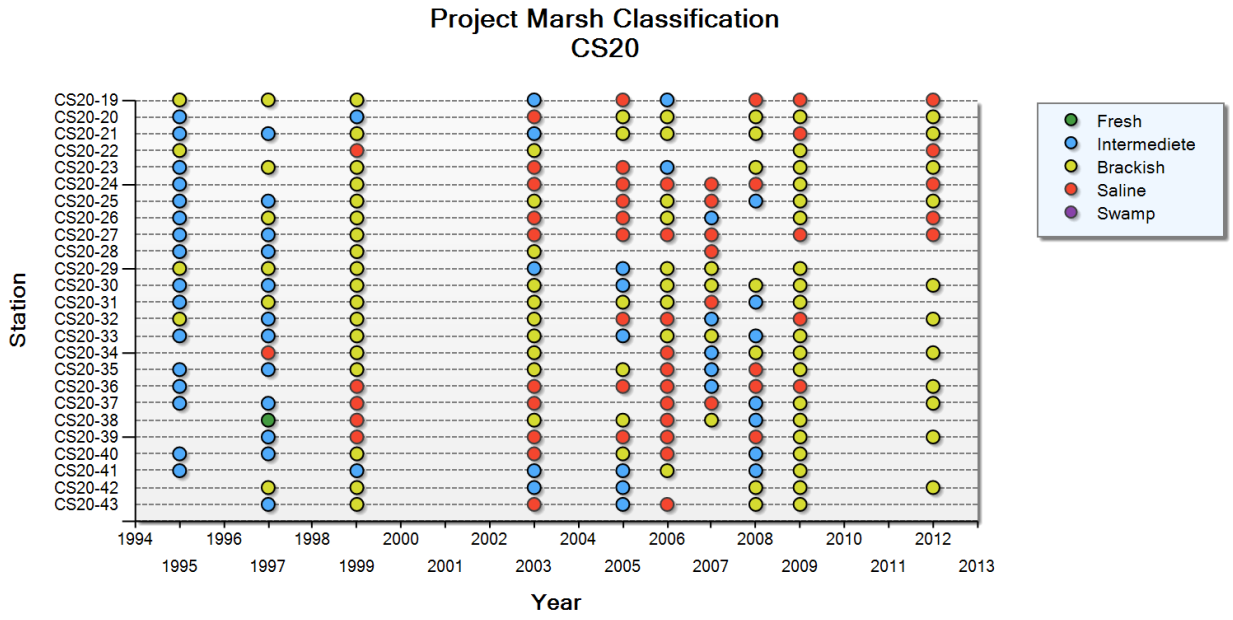


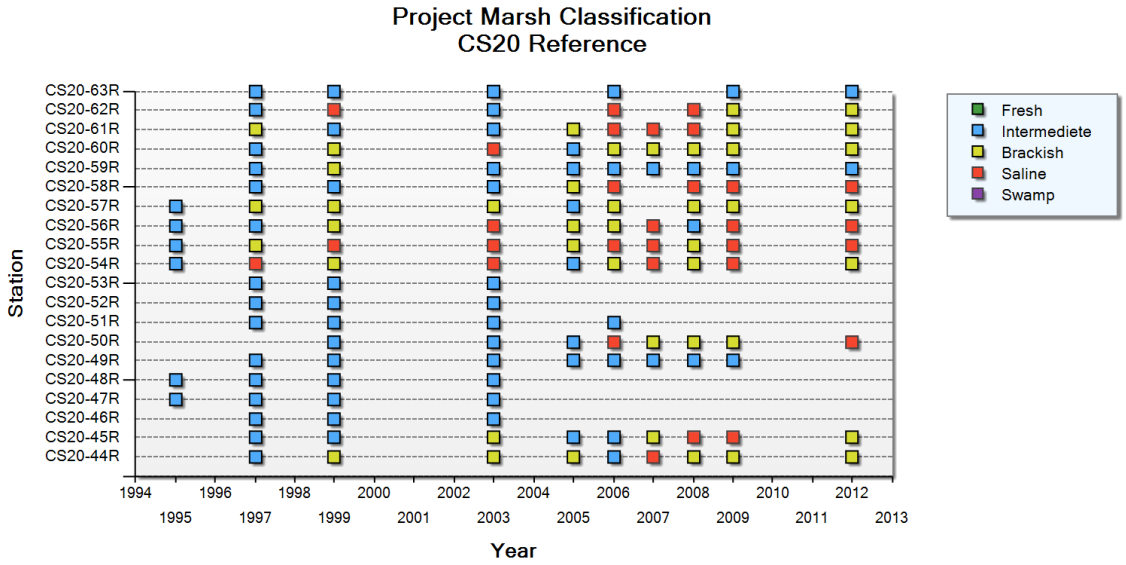
Project FQI


Floristic Quality Index for CS20
Mean % Cover
Floristic Quality Index
0
50
100
150
0
10
20
30
40
50
60
70
80
90
100
1995
1996
1997
1999
2000
2003
2005
2006
2007
2008
2009
2012
CS20 Project
CS20 Reference


Species Name (CC Score)
FQI
Spartina patens (9)
Spartina alterniflora (10)
Amaranthus australis (2)
Paspalum vaginatum (7)
Schoenoplectus robustus (7)
Schoenoplectus americanus
Phragmites australis (6)
Symphyotrichum tenuifolium
Symphyotrichum subulatum
Other

Project Marsh Class





Charting-Vegetation: Multi-Station Example

Previous Charting Version

Charting | Bulk Charting | Data Download | Reporting

- Hydro
- Vegetation
  - Forested
  - Herbaceous
  - Site Floristic Quality Index
  - Project/Reference FQI
  - Marsh Class
- Soil
- Spatial
- Report Card Charts

Clear Charts

Scale: Multi Station

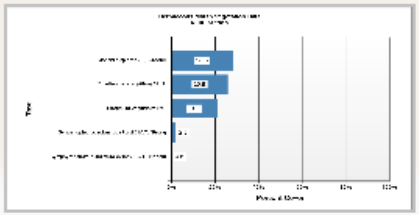
Year: 2008

Select an element below to populate the station selector.

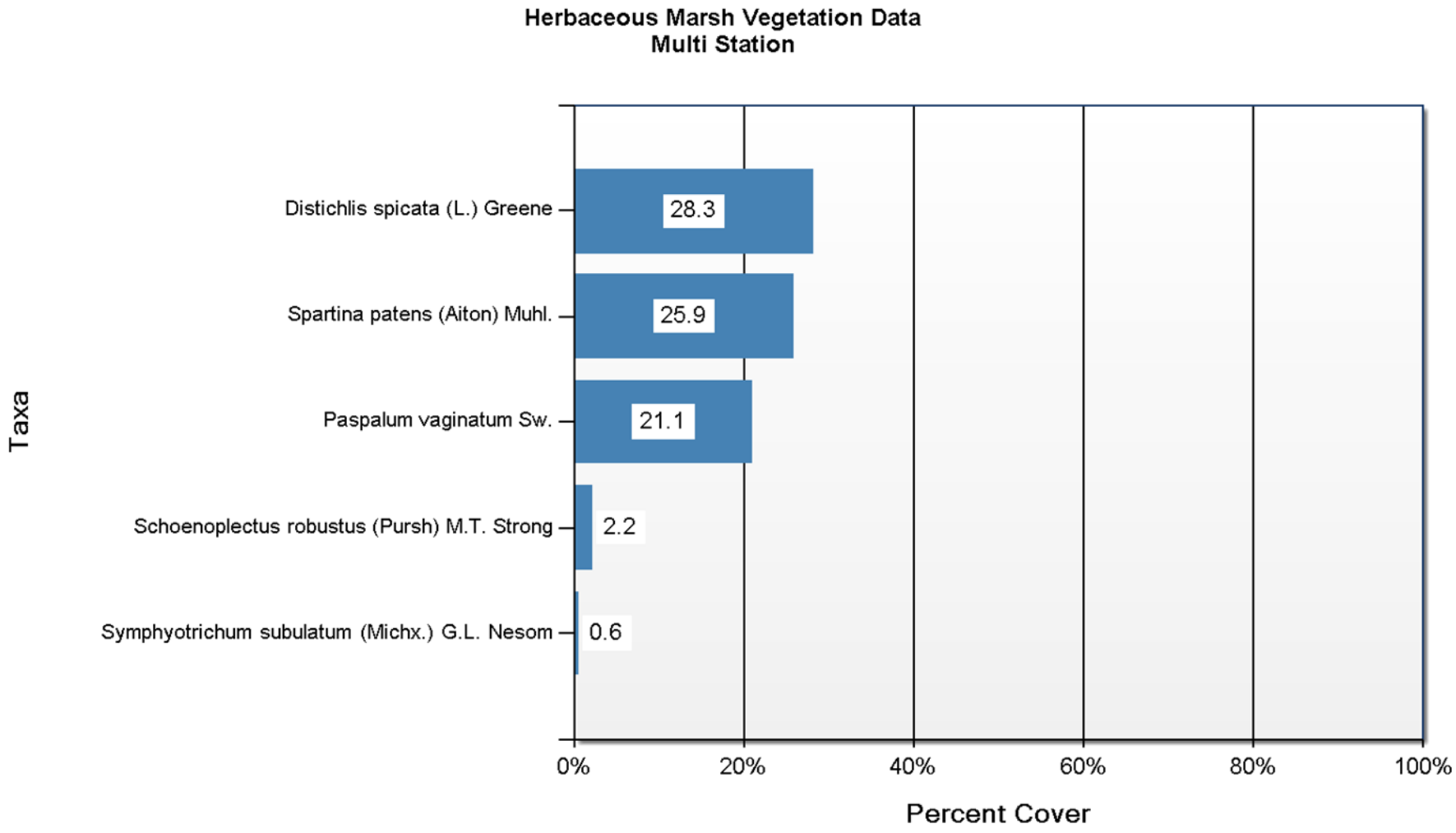
CRMS0661
CRMS0662
CRMS0663
CRMS0665
CRMS0669
CRMS0672

Select All	Deselect All
CRMS0672-V08 8/13/2008	CRMS0672-V06 8/13/2008
CRMS0672-V16 8/13/2008	CRMS0672-V09 8/13/2008
CRMS0672-V26 8/13/2008	CRMS0672-V47 8/13/2008
CRMS0672-V57 8/13/2008	CRMS0672-V64 8/13/2008
CRMS0672-V67 8/13/2008	CS20-19 9/23/2008
CRMS0672-V78 8/13/2008	

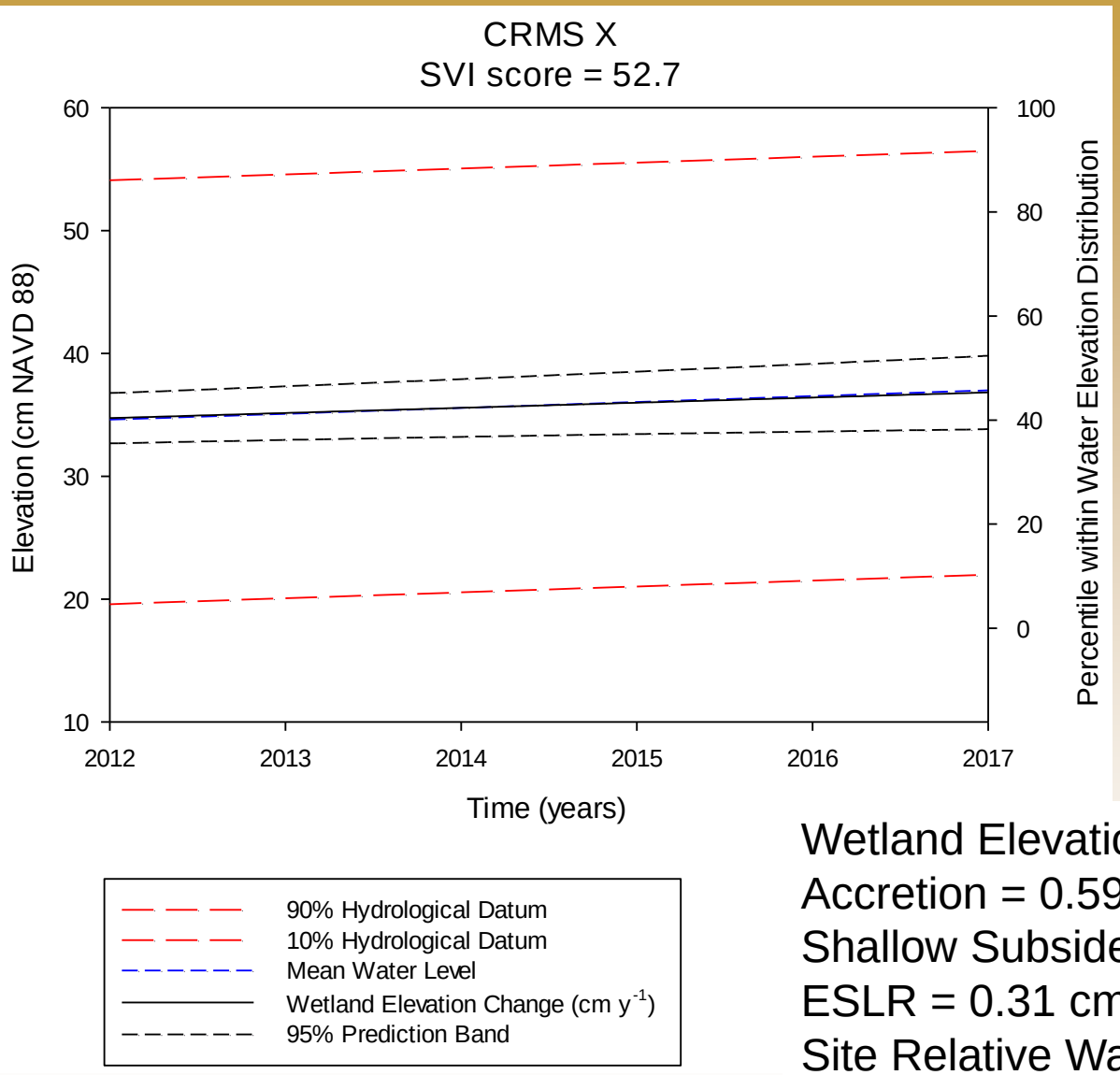
Submit Request



Charting-Vegetation: Multi-Station Example

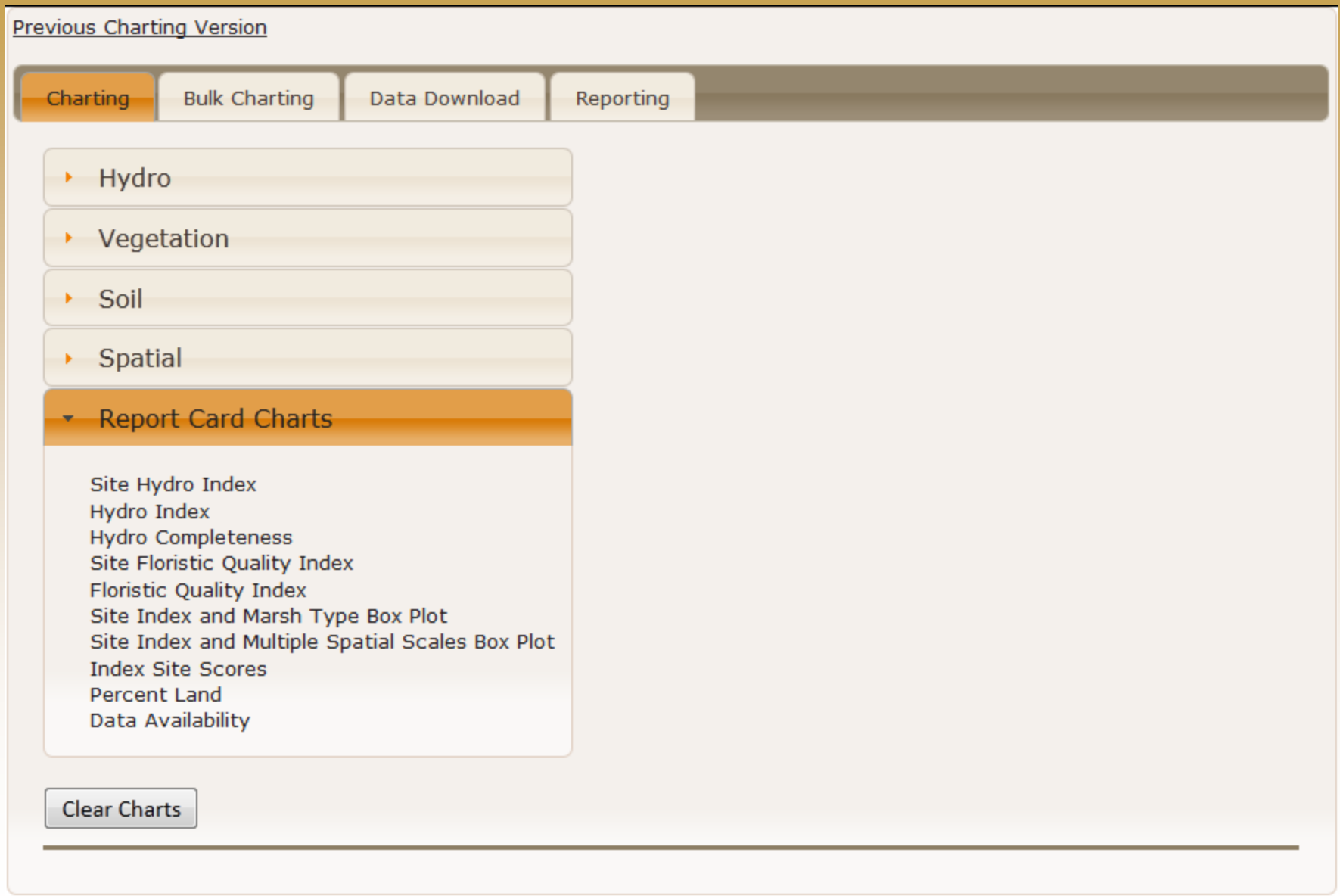


Charting-Soil: New Charts

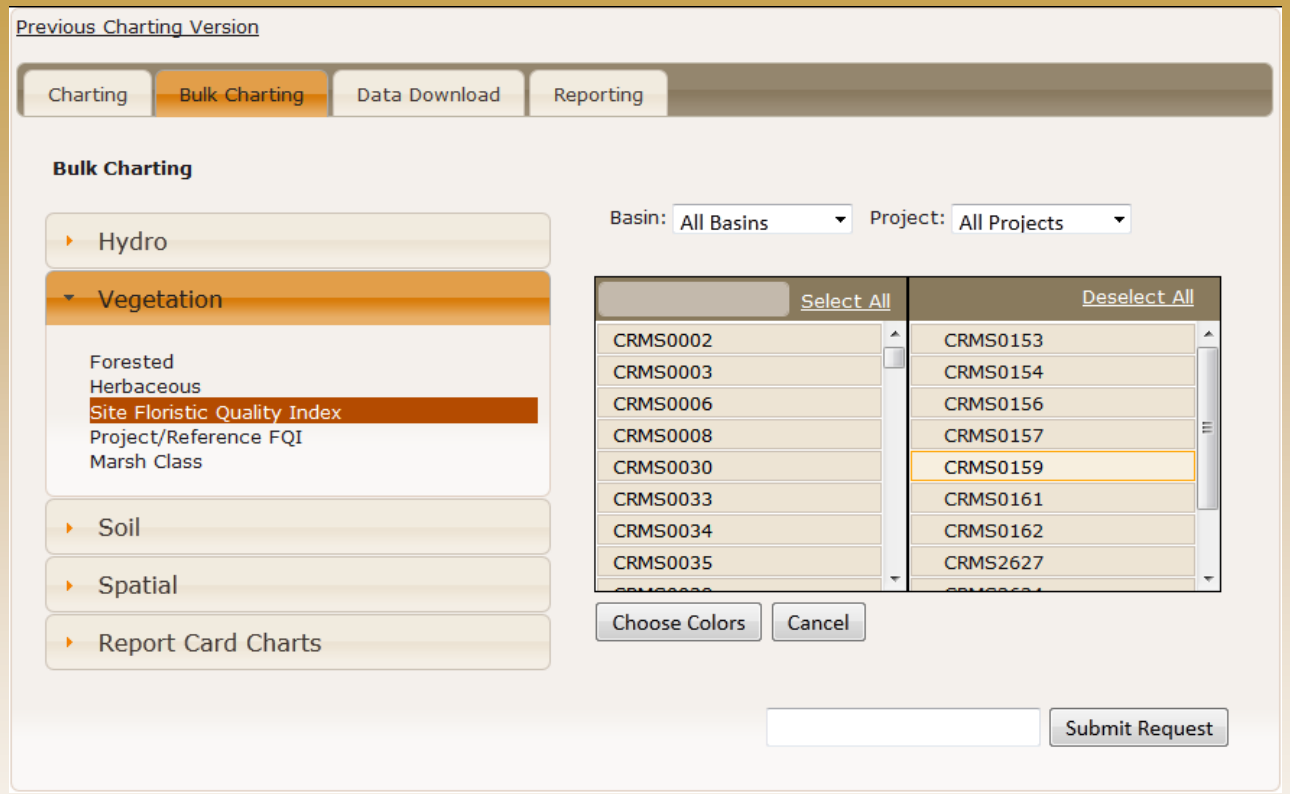


Wetland Elevation Change = 0.42 cm y^{-1}
Accretion = 0.59 cm y^{-1}
Shallow Subsidence = 0.17 cm y^{-1}
ESLR = 0.31 cm y^{-1}
Site Relative Water Level Trend = 0.48 cm y^{-1}
SVI Score = 52.7

Charting-Report Card: Available Charts

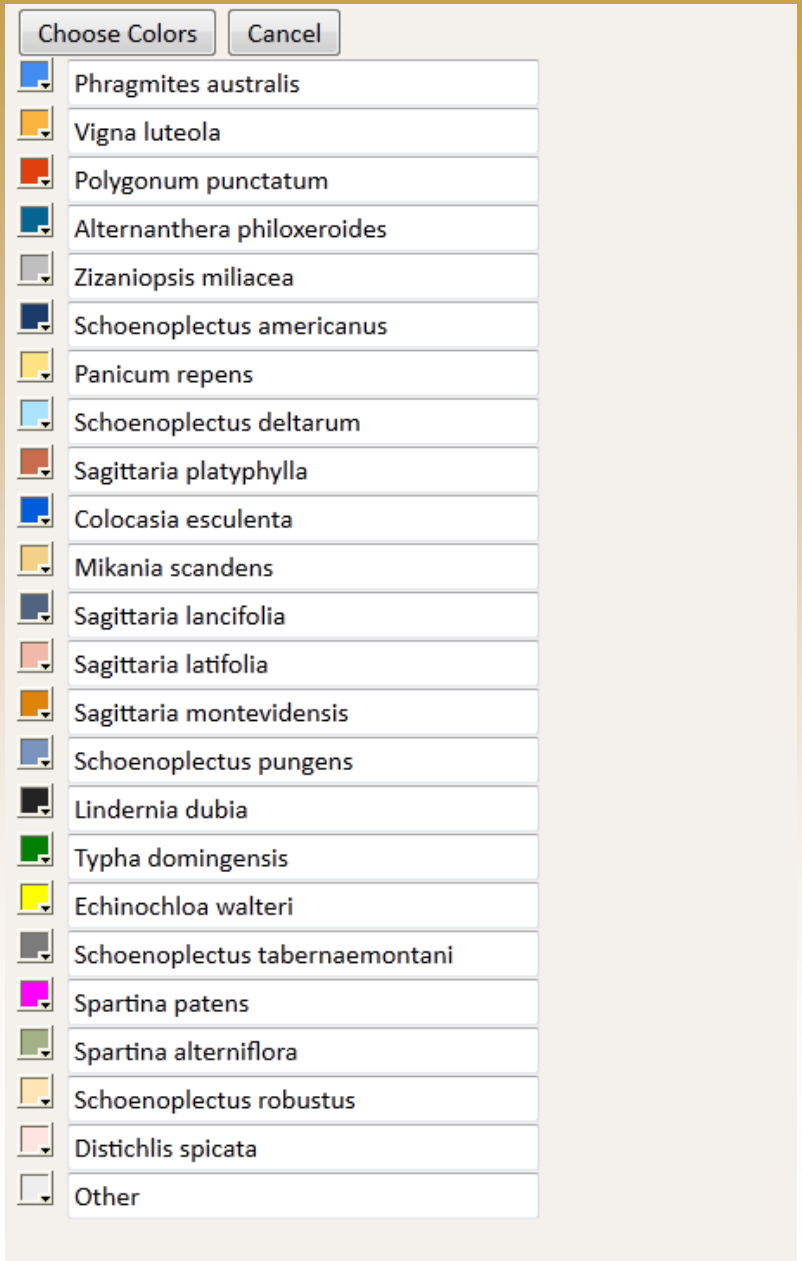


Bulk Charting: Vegetation Example



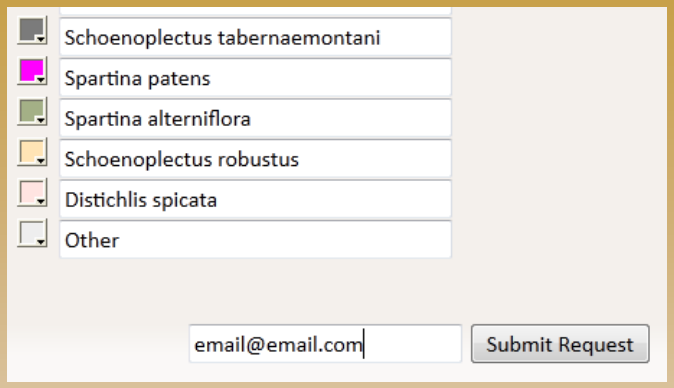
- Select Type
- Select Sites
- Define species color ramp (optional)
- Provide email
- View zipped package

Bulk Charting: Vegetation Example

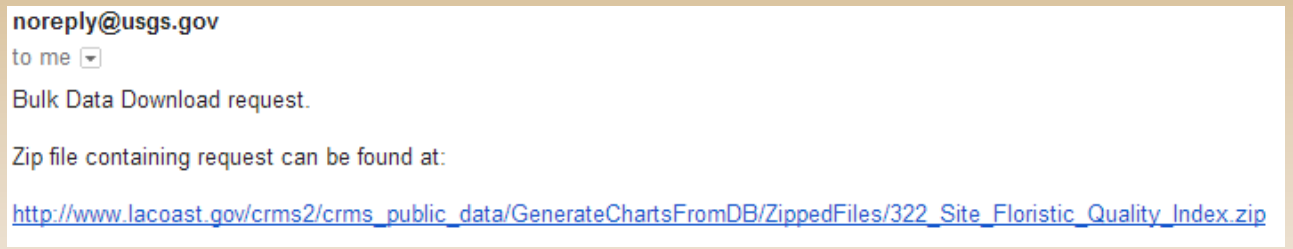


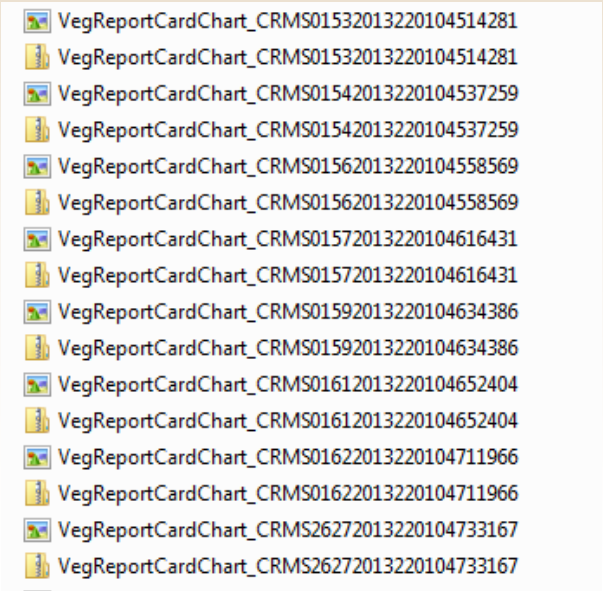
- Select Type
- Select Sites
- Define species color ramp (optional)
- Provide email
- View zipped package

Bulk Charting: Vegetation Example

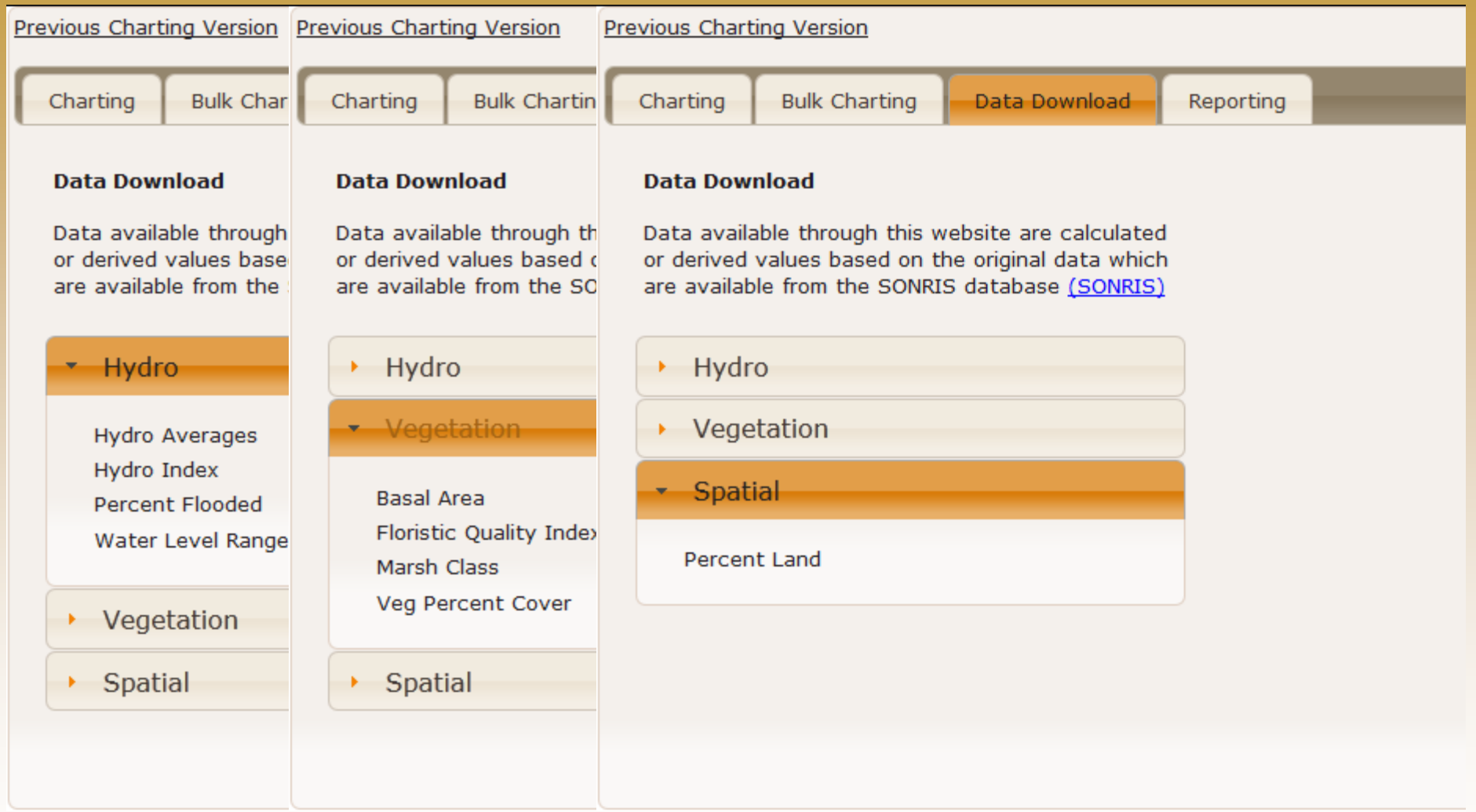


- Select Type
- Select Sites
- Define species color ramp (optional)
- Provide email
- View zipped package



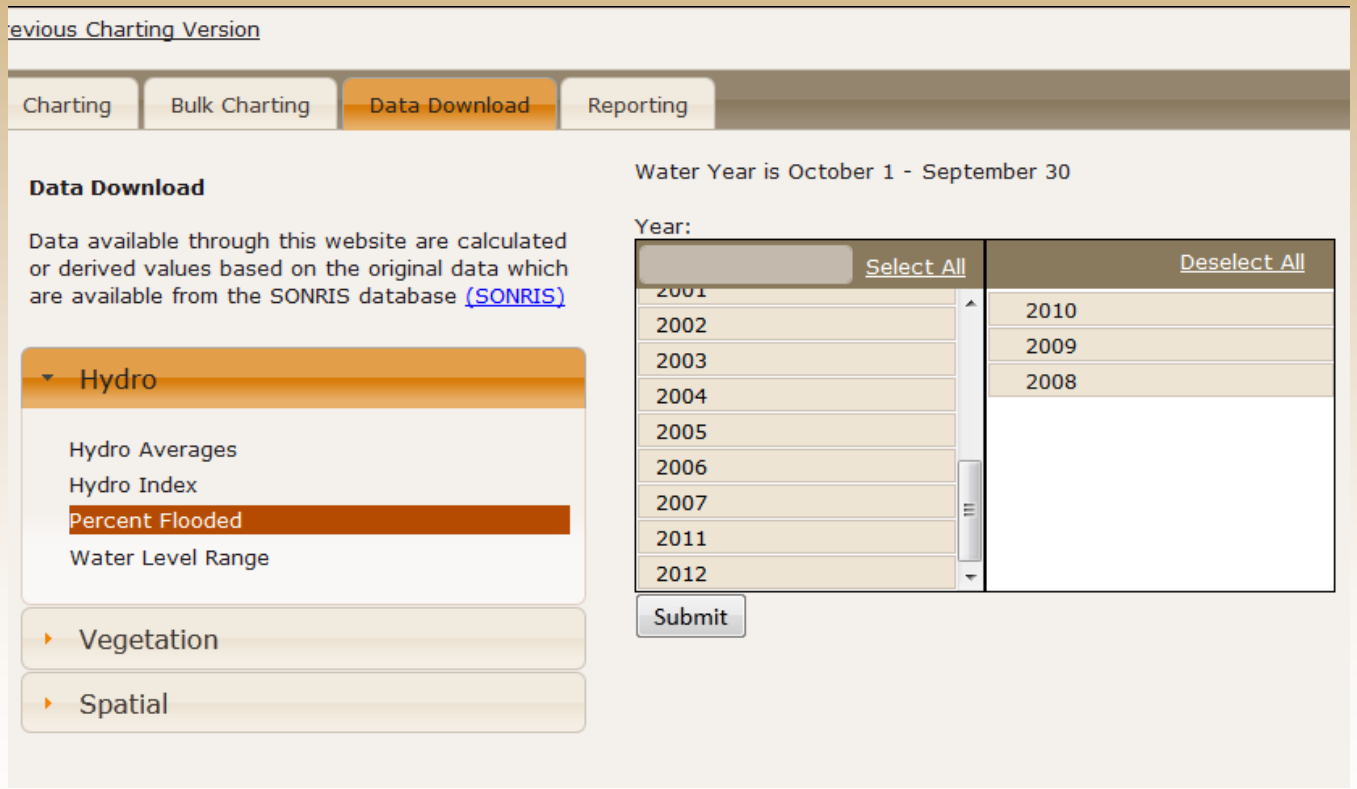


Bulk Data Download: Data Available

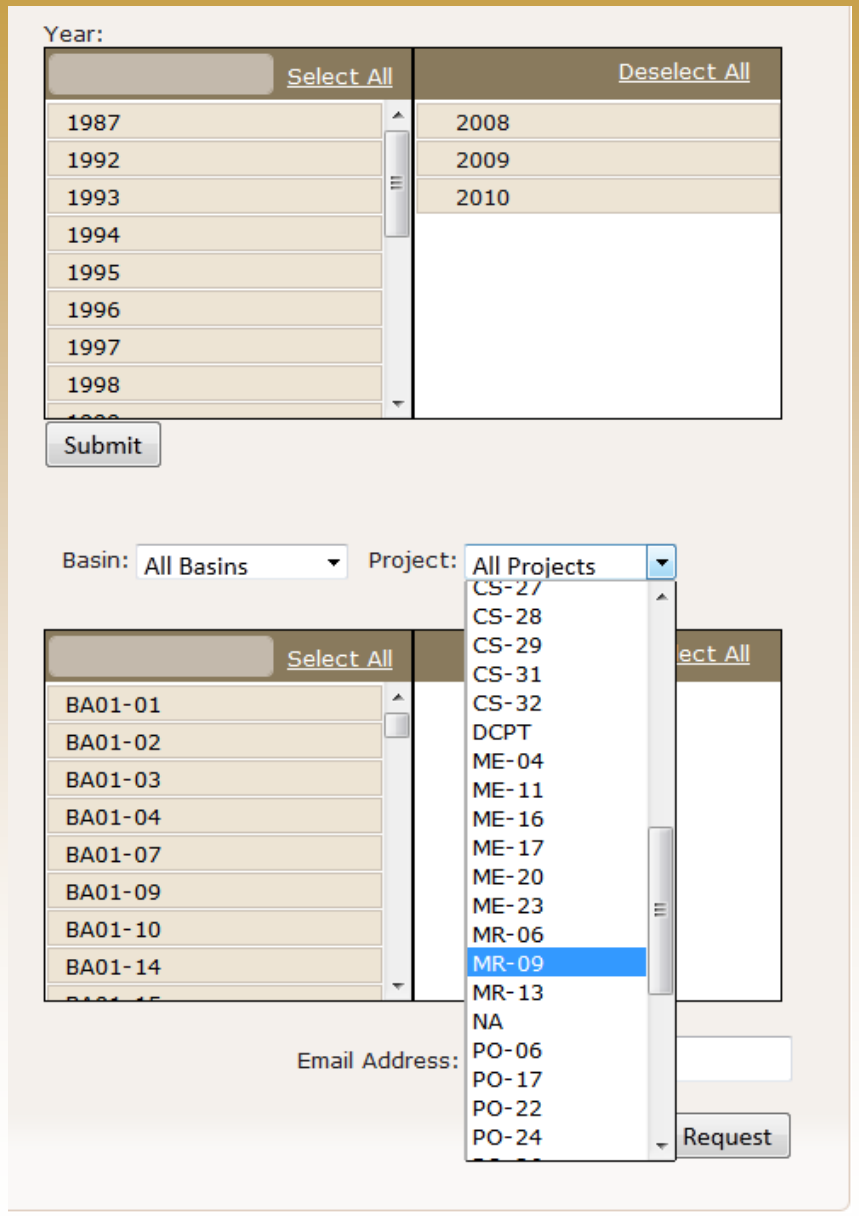


Bulk Data Download: Example

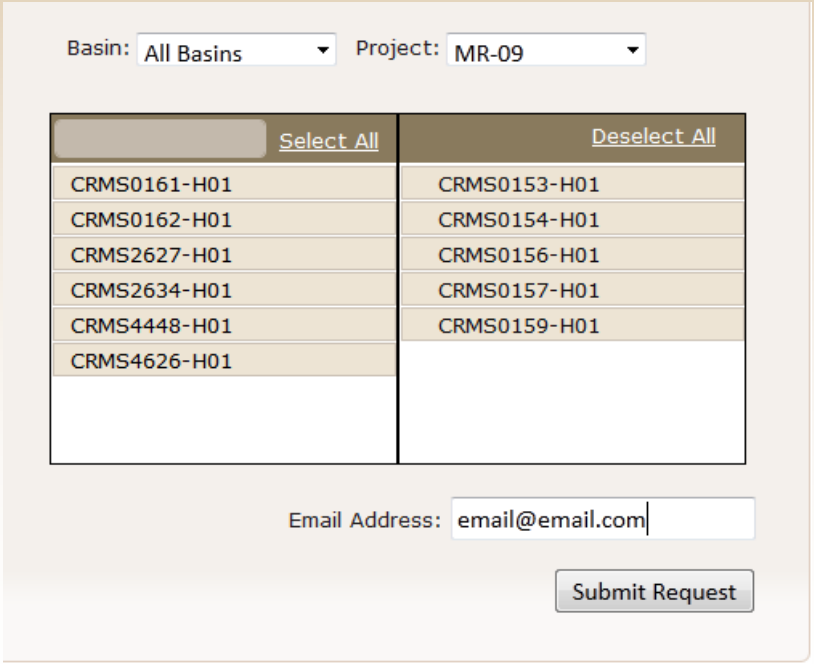
- Select Type
- Select Years
- Station selection
- Provide email
- View zipped package



Bulk Data Download: Example



- Select Type
- Select Years
- Station selection
- Provide email
- View zipped package



Bulk Data Download: Example

- Select Type
- Select Years
- Station selection
- Provide email
- View zipped package

Year:

Select All	Deselect All
1987	2008
1992	2009
1993	2010
1994	
1995	
1996	
1997	
1998	

Submit

Basin: All Basins Project: MR-09

Select All	Deselect All
CRMS0161-H01	CRMS0153-H01
CRMS0162-H01	CRMS0154-H01
CRMS2627-H01	CRMS0156-H01
CRMS2634-H01	CRMS0157-H01
CRMS4448-H01	CRMS0159-H01
CRMS4626-H01	

Email Address: email@email.com

Submit Request

noreply@usgs.gov

to me

Bulk Data Download request.

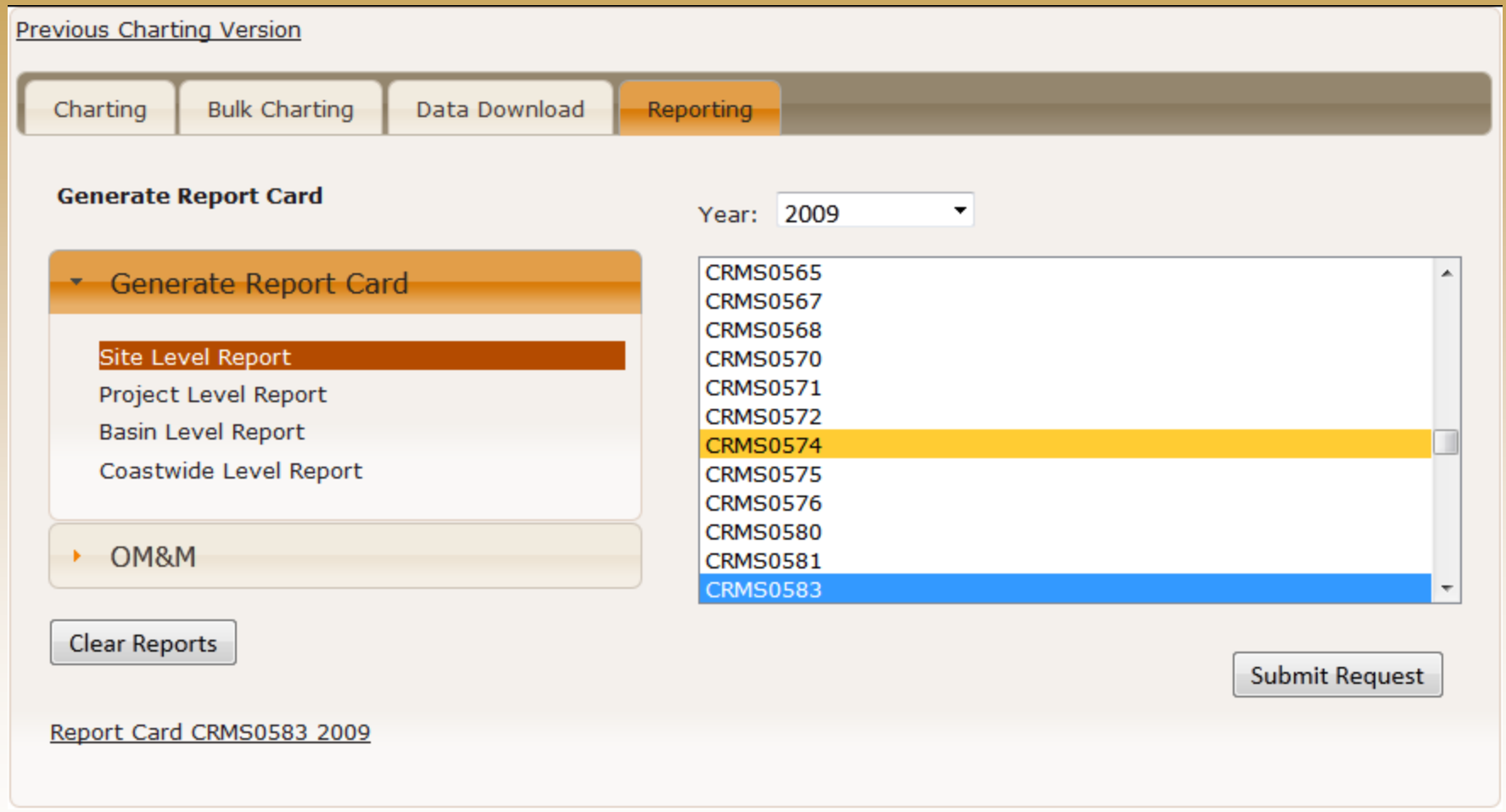
Zip file containing request can be found at:

http://www.lacoast.gov/crms2/crms_public_data/GenerateDataFromDB/ZippedFiles/297_PercentFlooded.zip

297 [Read-Only]

	A	B	C	D
1	Station_Id	PercentFlooded	Year	PercentComplete
2	CRMS0153-H01	0.996009893	2008	0.829680365
3	CRMS0153-H01	0.992569647	2009	0.921803653
4	CRMS0153-H01	0.998626519	2010	0.997374429
5	CRMS0154-H01	0.51837899	2008	1
6	CRMS0154-H01	0.623563627	2009	0.784817352
7	CRMS0154-H01	0.779207572	2010	0.674200913
8	CRMS0156-H01	0.609246568	2008	1
9	CRMS0156-H01	0.607944132	2009	0.997260274
10	CRMS0156-H01	0.811033526	2010	0.997374429
11	CRMS0157-H01	0.865248217	2008	0.997945205
12	CRMS0157-H01	0.866490634	2009	0.994406393

Reporting: CRMS Report Card



Reporting: CRMS Report Card

Coastwide Reference Monitoring System (CRMS)

Site Level Report Card

Site: CRMS0583

Year: 2009

6/18/2012

About the Interactive Report Card

Through the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) a comprehensive, standardized monitoring and assessment program has been developed to evaluate coastal restoration projects throughout the Louisiana coastal zone. The Coastwide Reference Monitoring System (CRMS) collects monitoring data for numerous ecological variables. Using CRMS data, indices have been developed to assess wetland hydrology, vegetation, and soils. This interactive report card provides summary information and displays index scores for individual CRMS sites, restoration projects, hydrologic basins, and the entire Louisiana coast.

Index Development

What is an Index?

An index combines and synthesizes scientific data to help inform or assess a topic of interest. Each index helps explain the condition of a particular aspect of the coastal wetland ecosystem. By comparing indices at various time and spatial scales we can understand the overall condition of coastal wetlands in Louisiana.

How were the indices developed?

CRMS Analytical Teams, made up of agency and academic personnel, developed indices based on the suite of parameters available from the 2006 to 2009 CRMS dataset. Three indices have been developed: a floristic quality (FQI), hydrologic (HI), and submergence vulnerability (SVI), and a landscape index is currently being refined. Wetland vegetation, hydrology, and soils are undeniably interconnected and form the basis for ecological processes that ultimately influence future land change and the sustainability of coastal habitats. Although these indices have been developed using 4 years of baseline CRMS data, the indices will be refined to better define ecological relationships as the data set becomes more robust overtime.

Because no regulatory thresholds exist for the ecological parameters of interest, it was not possible to assess index scores based on previously defined values that would indicate an acceptable or unacceptable score. Therefore, for the FQI and the HI, assessments were made relative to a baseline distribution of the index scores derived from 2006 to 2009 data at CRMS sites across the Louisiana coast. Because ideal thresholds were not available for the FQI and HI, scores were classified as 'good' (green) if they exceeded the 75th percentile of index scores calculated for all CRMS sites during the baseline period, 'poor' (red) if they did not exceed the 25th percentile, or 'fair' (yellow) if they were intermediate to the 25th and 75th percentiles (Figure 1).

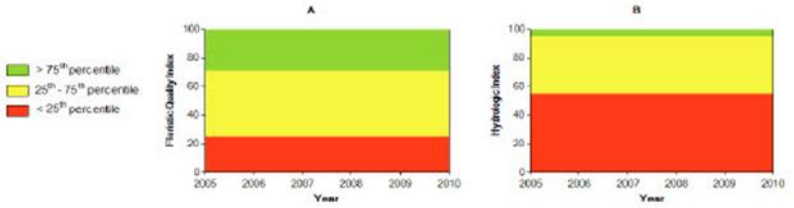


Figure 1. Example of how classifications change based on the assessment index and index score distribution. A) Floristic Quality Index distribution and B) Hydrologic Index distribution based on coastwide data from 2006 to 2009.

Reporting: OM&M Report

Previous Charting Version

Charting | Bulk Charting | Data Download | Reporting

Generate Report Card

State Number: MR-09

Generate Report Card

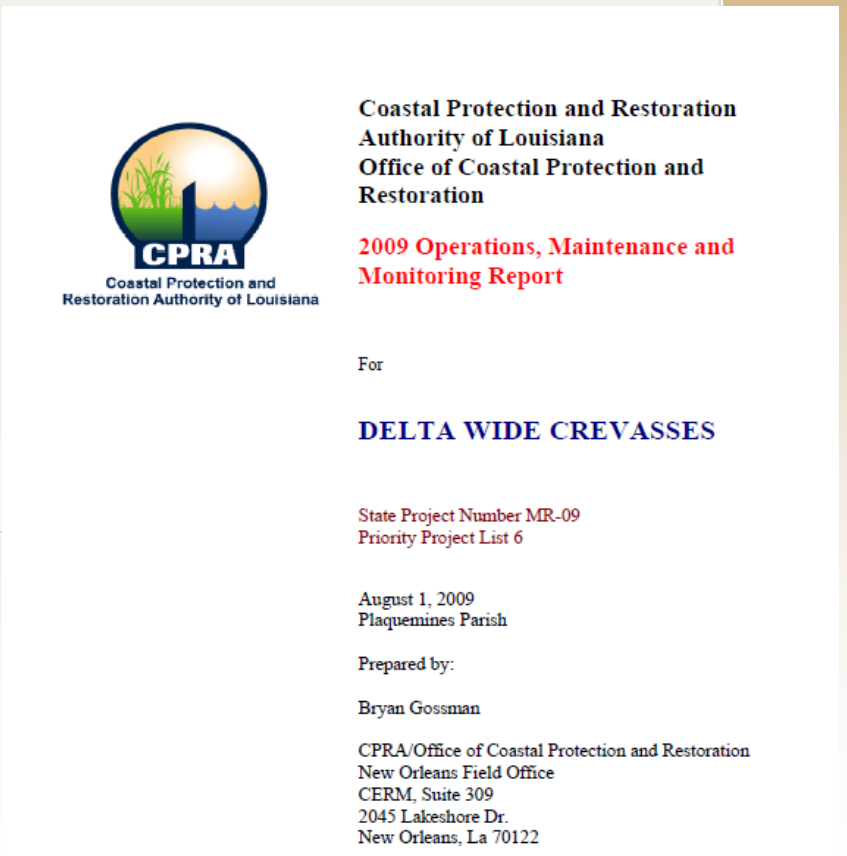
OM&M

OM&M report

Clear Reports

Report Card MR-09 2004 Operations, Maintenance, and Monitoring Report

Report Card MR-09 2009 Operations, Maintenance & Monitoring Report



Coastal Protection and Restoration Authority of Louisiana

Coastal Protection and Restoration Authority of Louisiana
Office of Coastal Protection and Restoration

2009 Operations, Maintenance and Monitoring Report

For

DELTA WIDE CREVASSES

State Project Number MR-09
Priority Project List 6

August 1, 2009
Plaquemines Parish

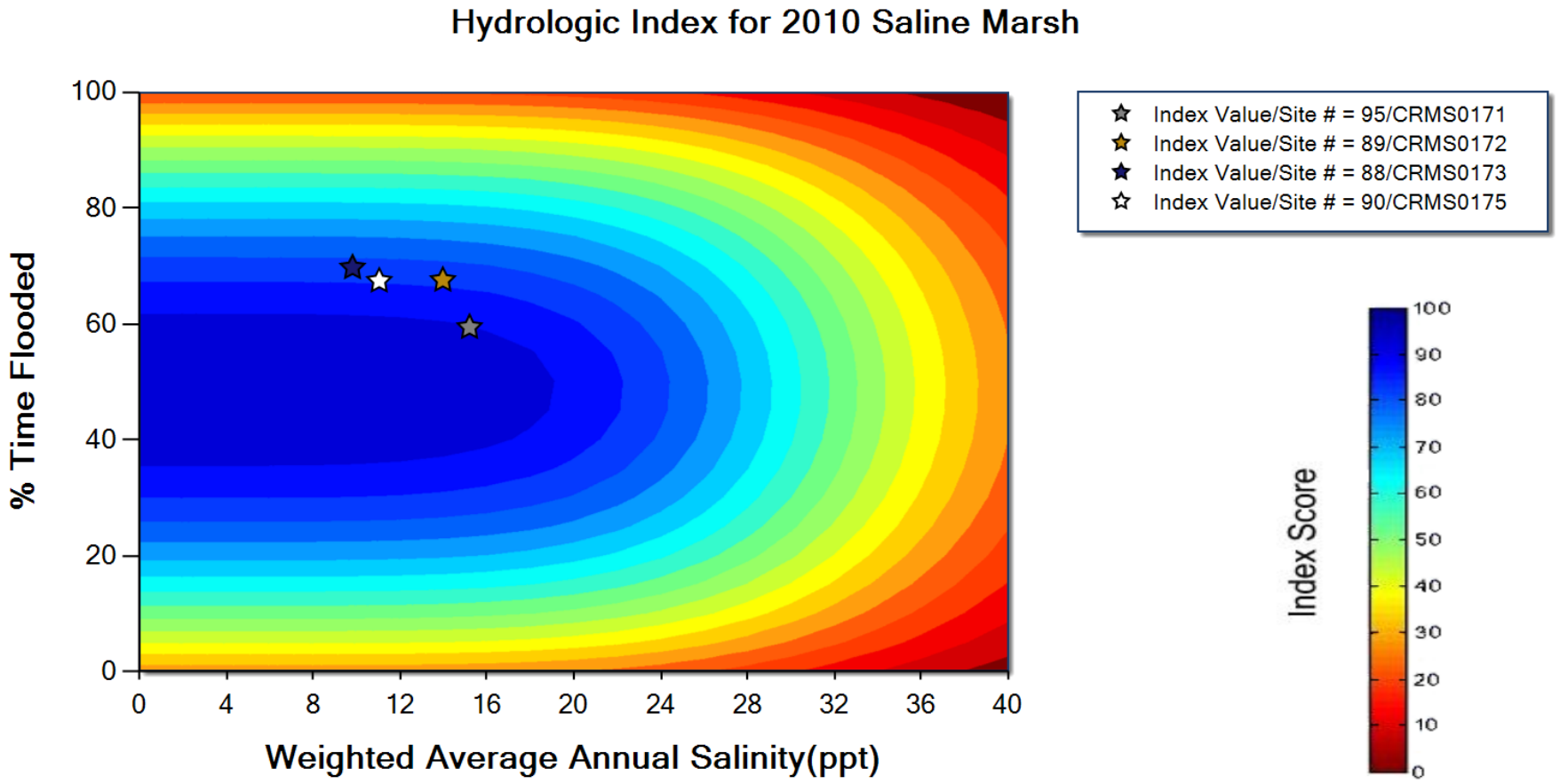
Prepared by:

Bryan Gossman

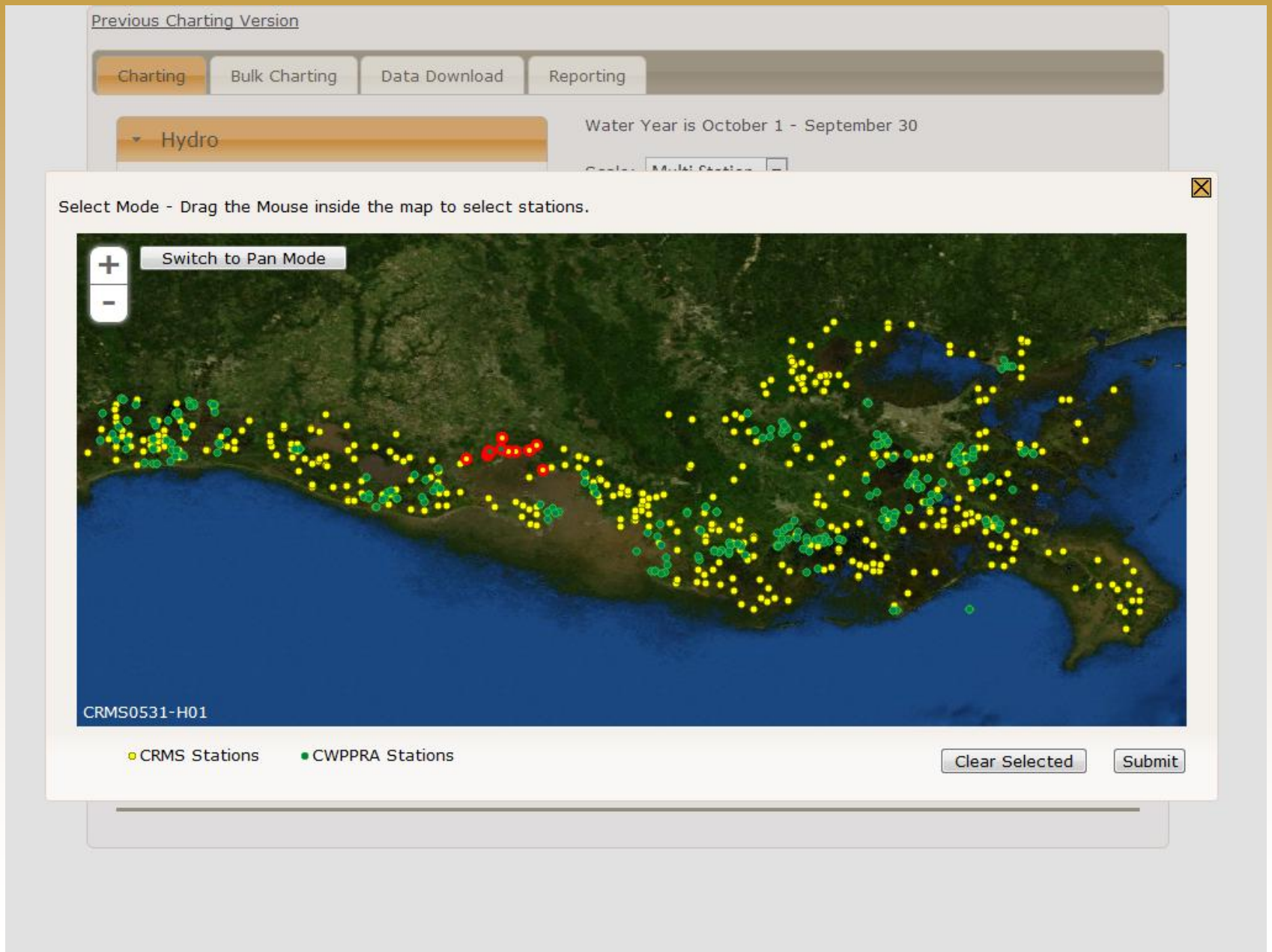
CPRA/Office of Coastal Protection and Restoration
New Orleans Field Office
CERM, Suite 309
2045 Lakeshore Dr.
New Orleans, La 70122

Staged: Multi-Site Plot (hydro index)

Limited to 5 sites which have a common marsh type in the same water year.



Staged: Map driven station selector

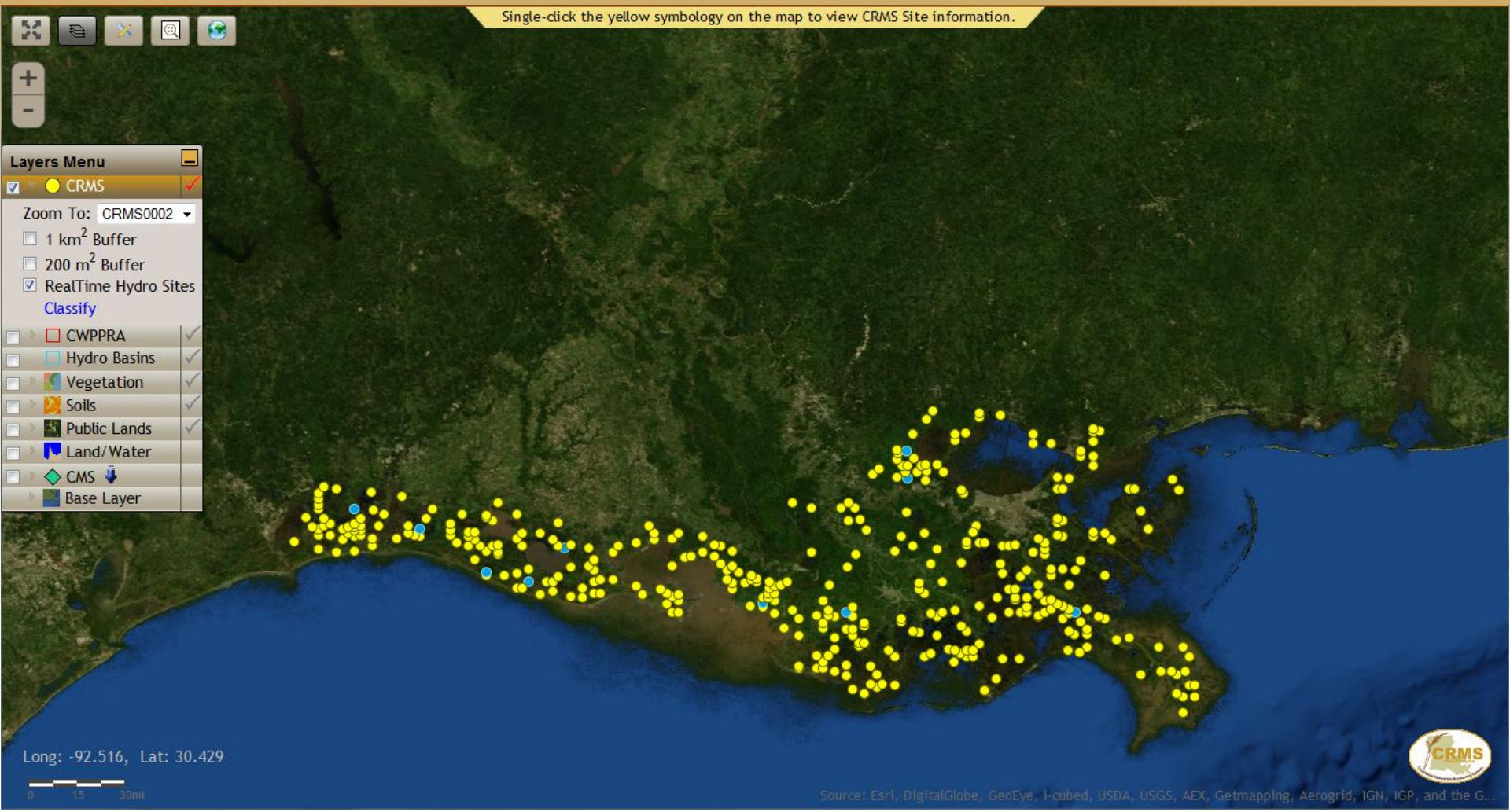


Mapping

- **Released to Production**
  - New Map interface using ESRI JavaScript API
  - Improvements to various “bubble” windows/tabs
  - Improvements to vegetation difference layer
  - Improvements to “tools” interface
  - Hydro basins is available as an active layer
  - Added public lands layer
- **Staged**
  - Save map state, (current layers, active layer, zoom, map center)
  - Additional numeric breakdown by basin of classified CRMS sites

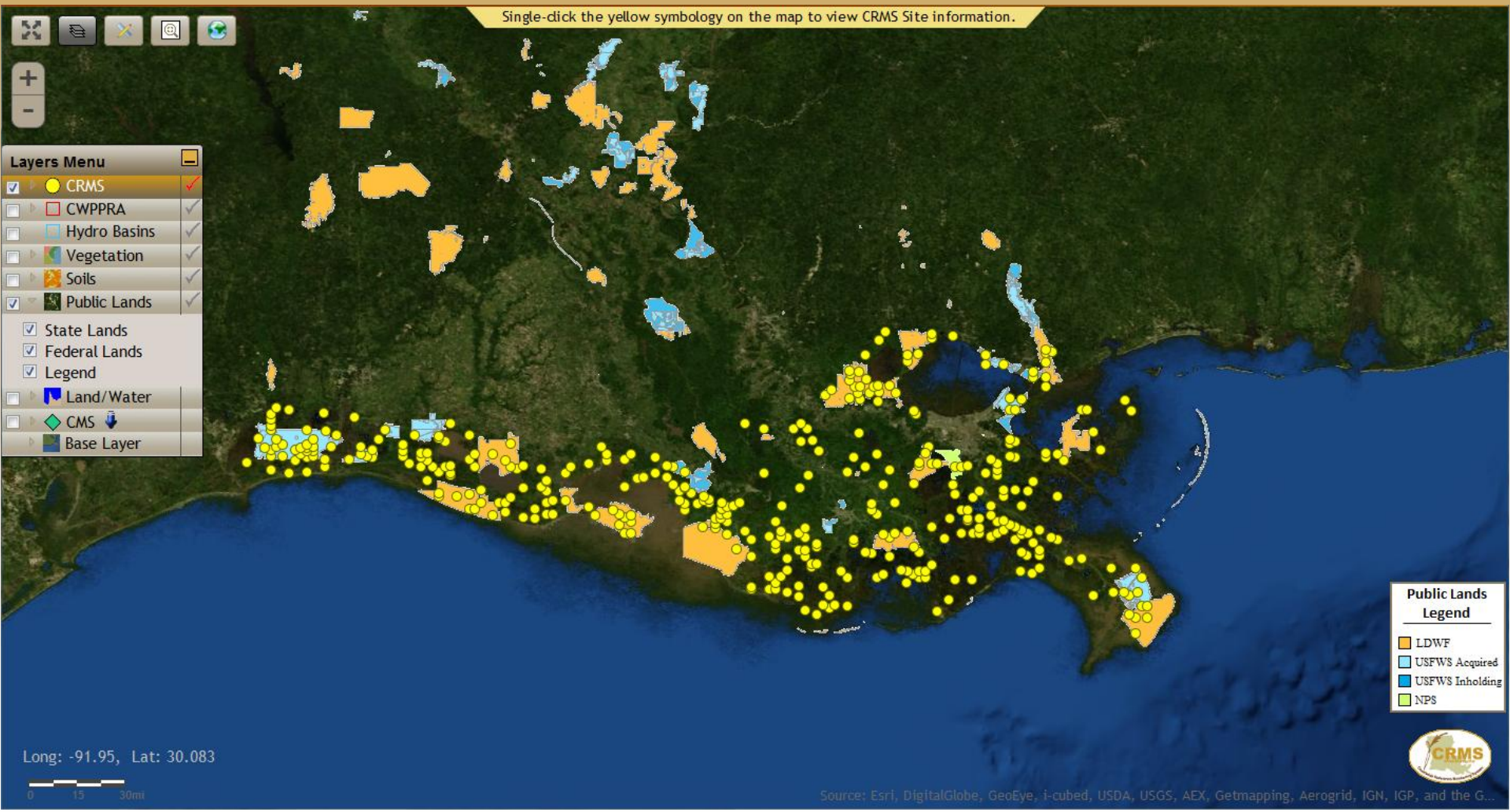
CRMS Viewer: Overview

CRMS Viewer: New Layer CRMS RealTime Hydro

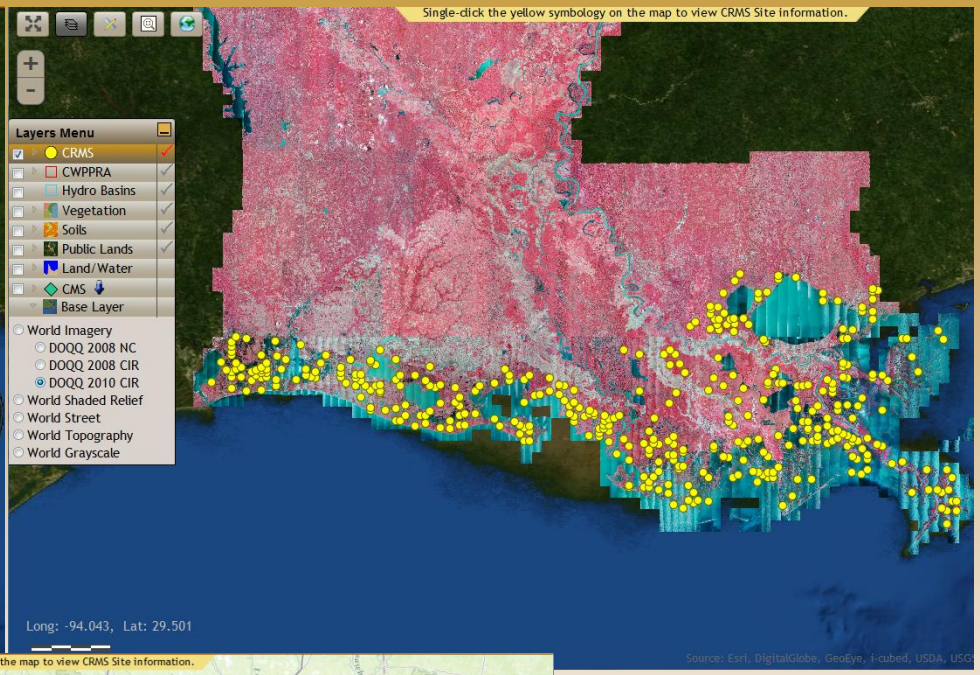


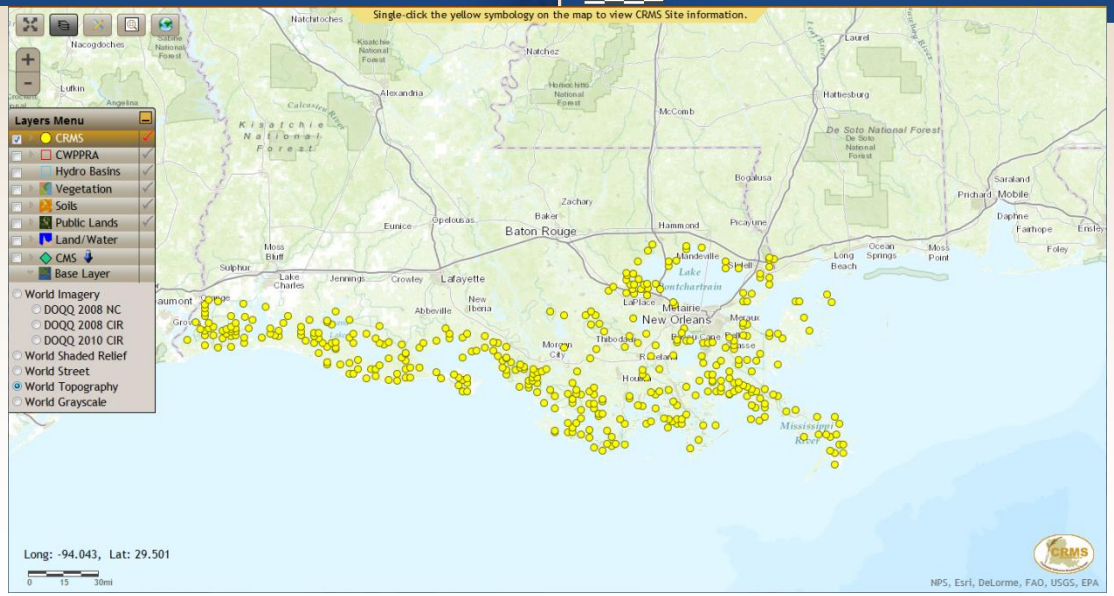
CRMS Viewer: CRMS Labels

CRMS Viewer: New Layer Public Lands



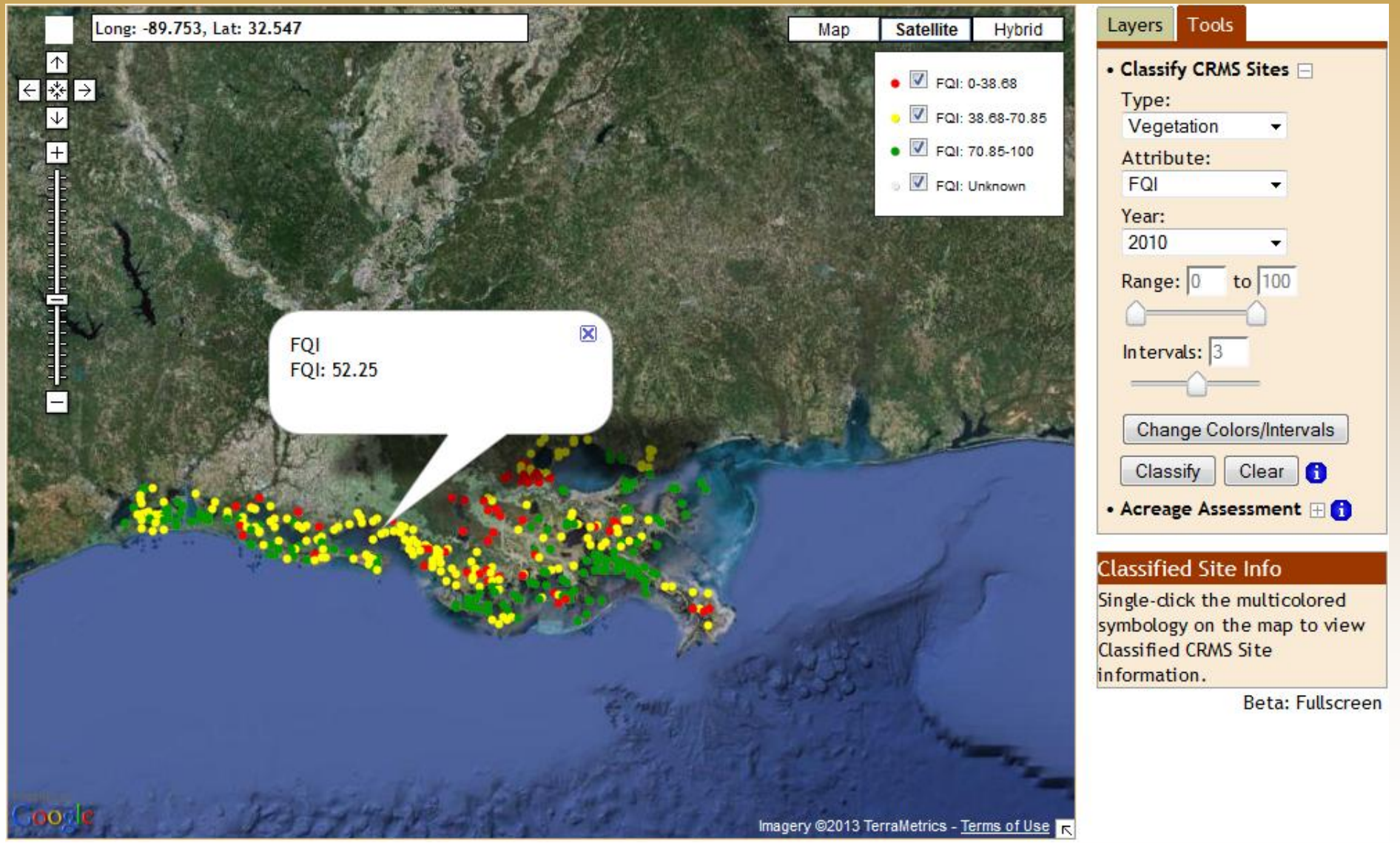
CRMS Viewer: New Base Layers



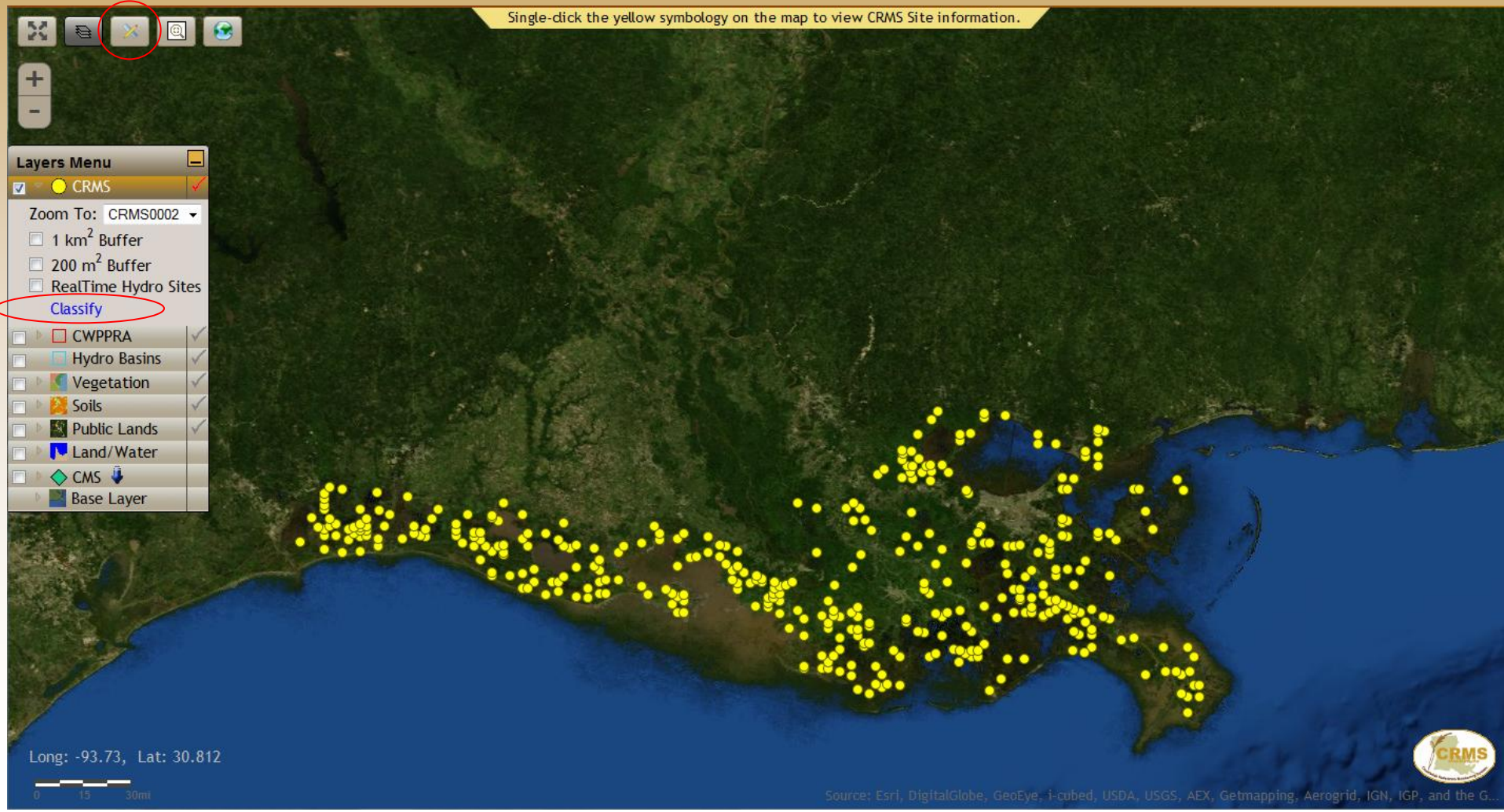


Tools Interfaces

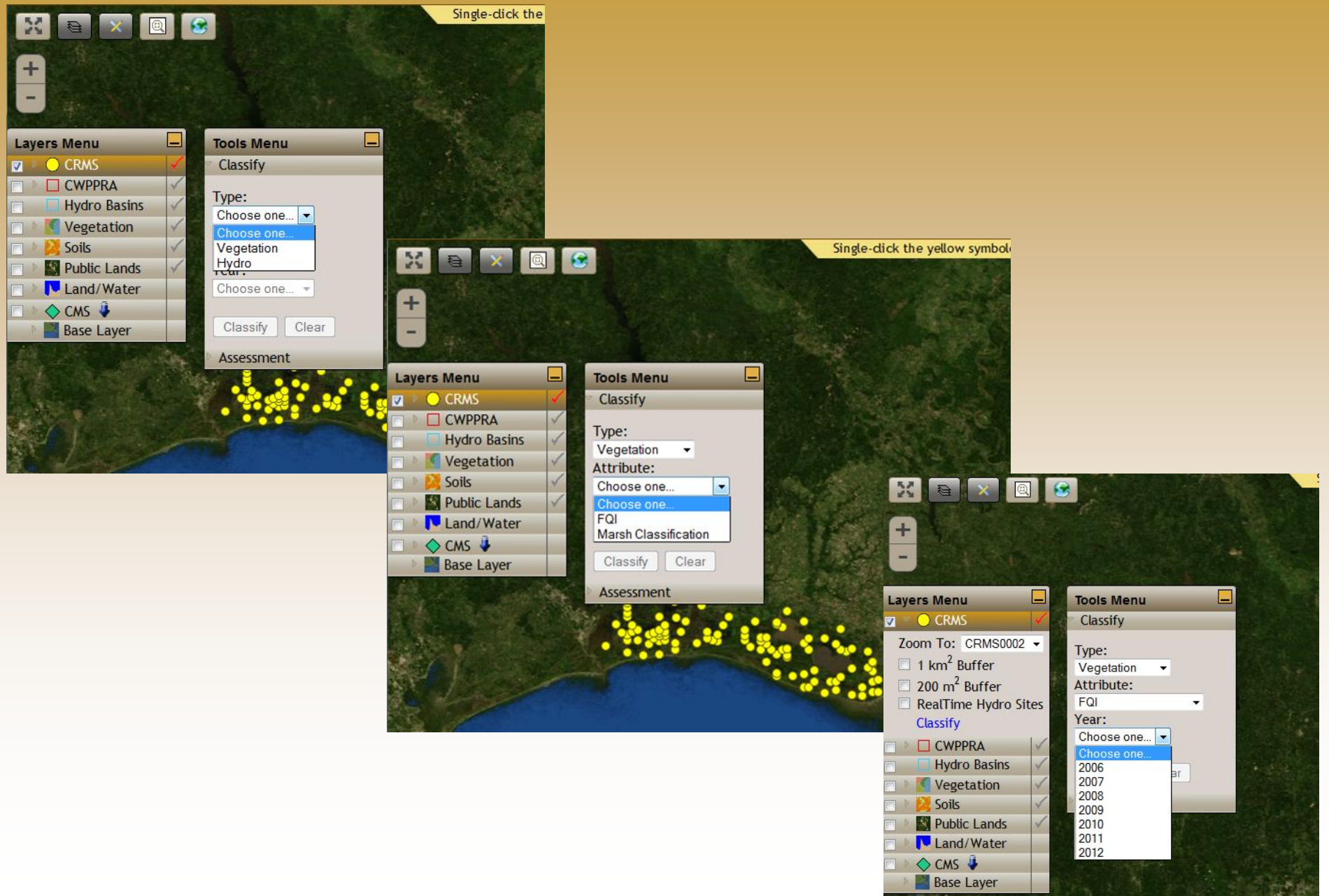
CRMS Viewer: Old Classification



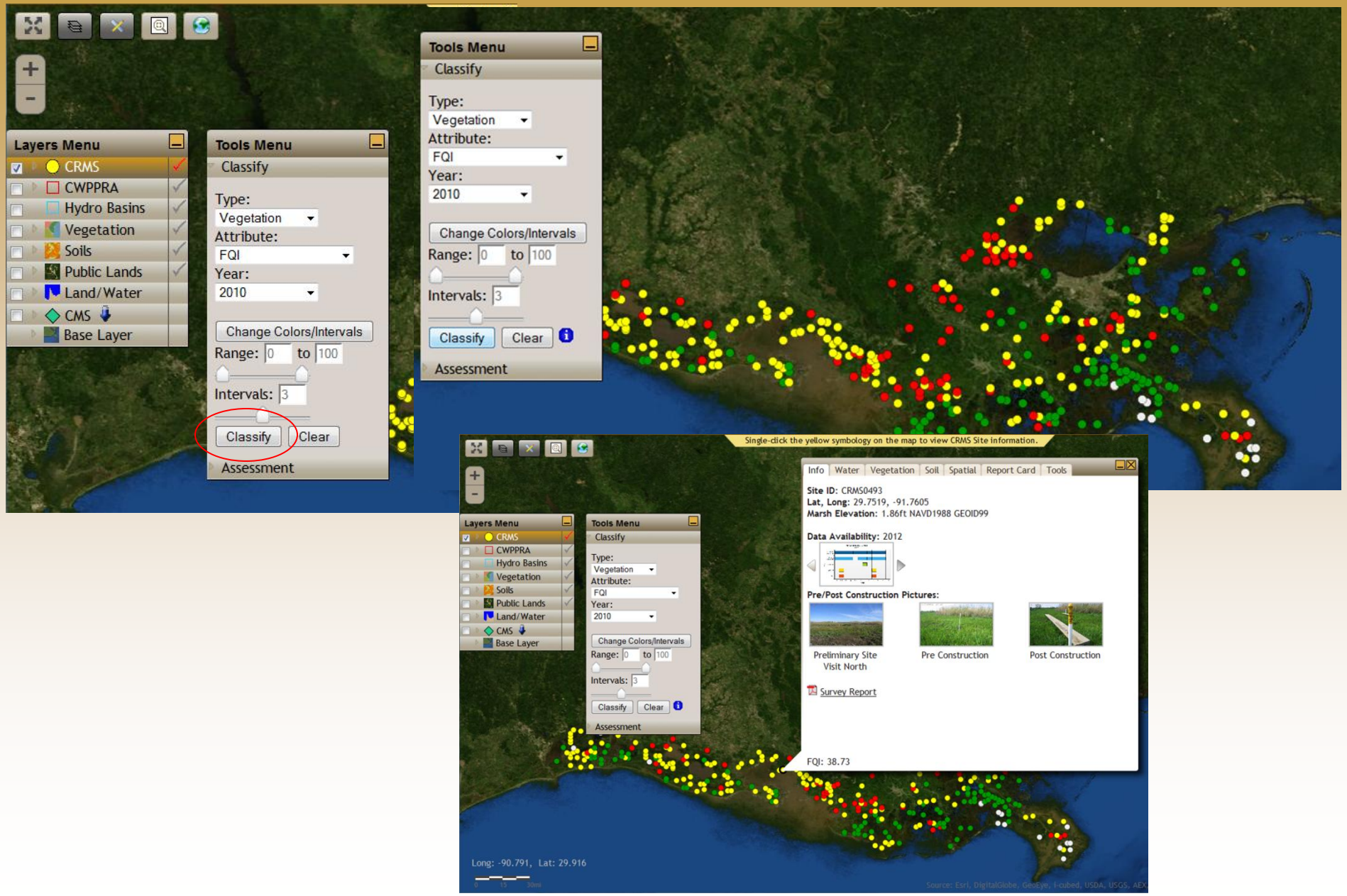
CRMS Viewer: Classification Tool



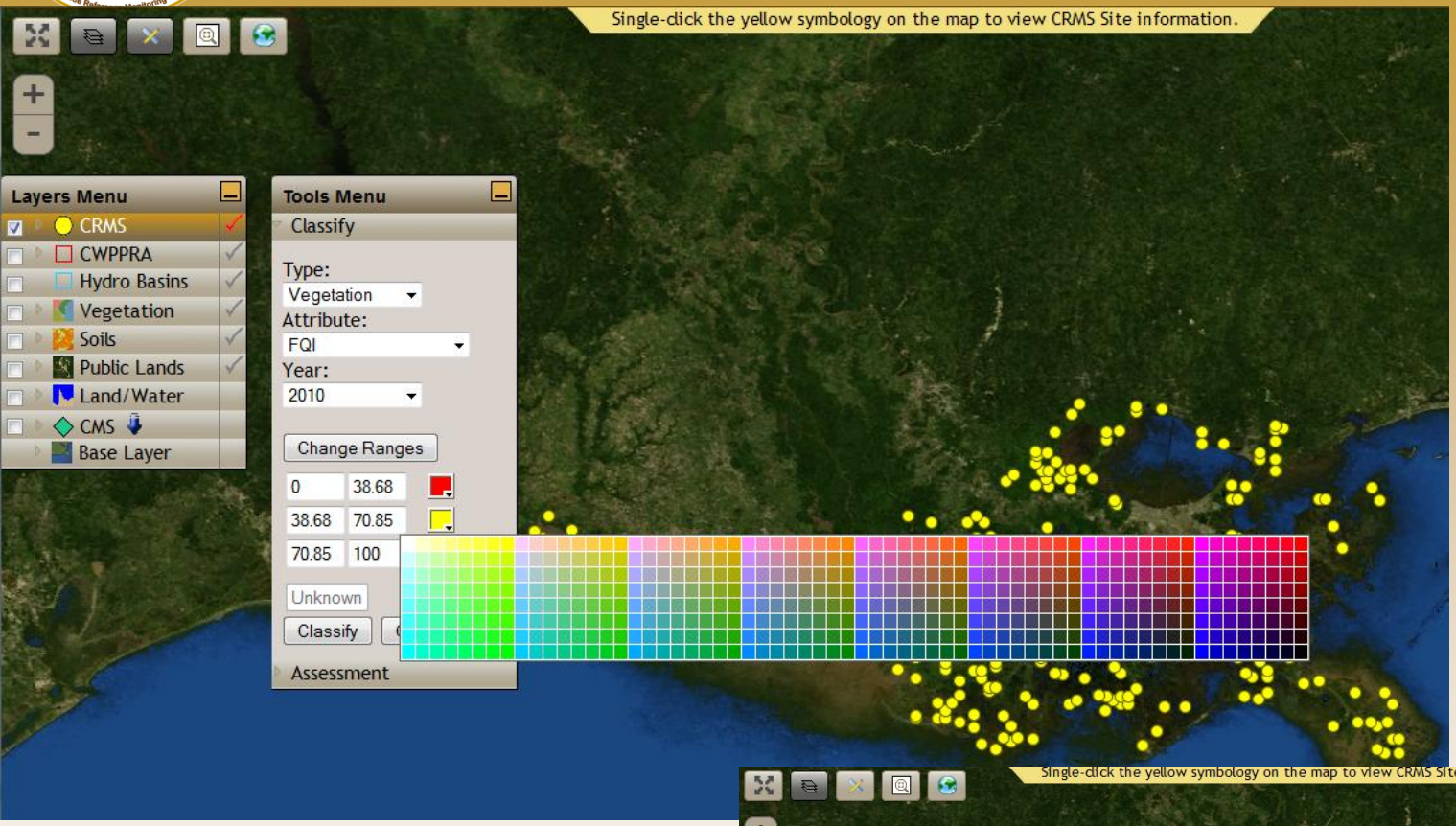
CRMS Viewer: Classification Tool

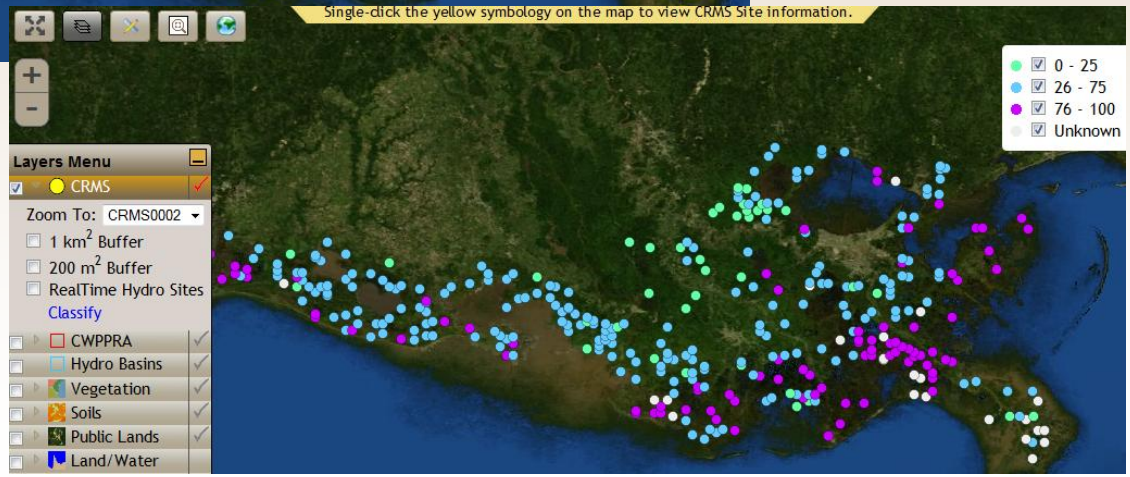


CRMS Viewer: Classification Tool

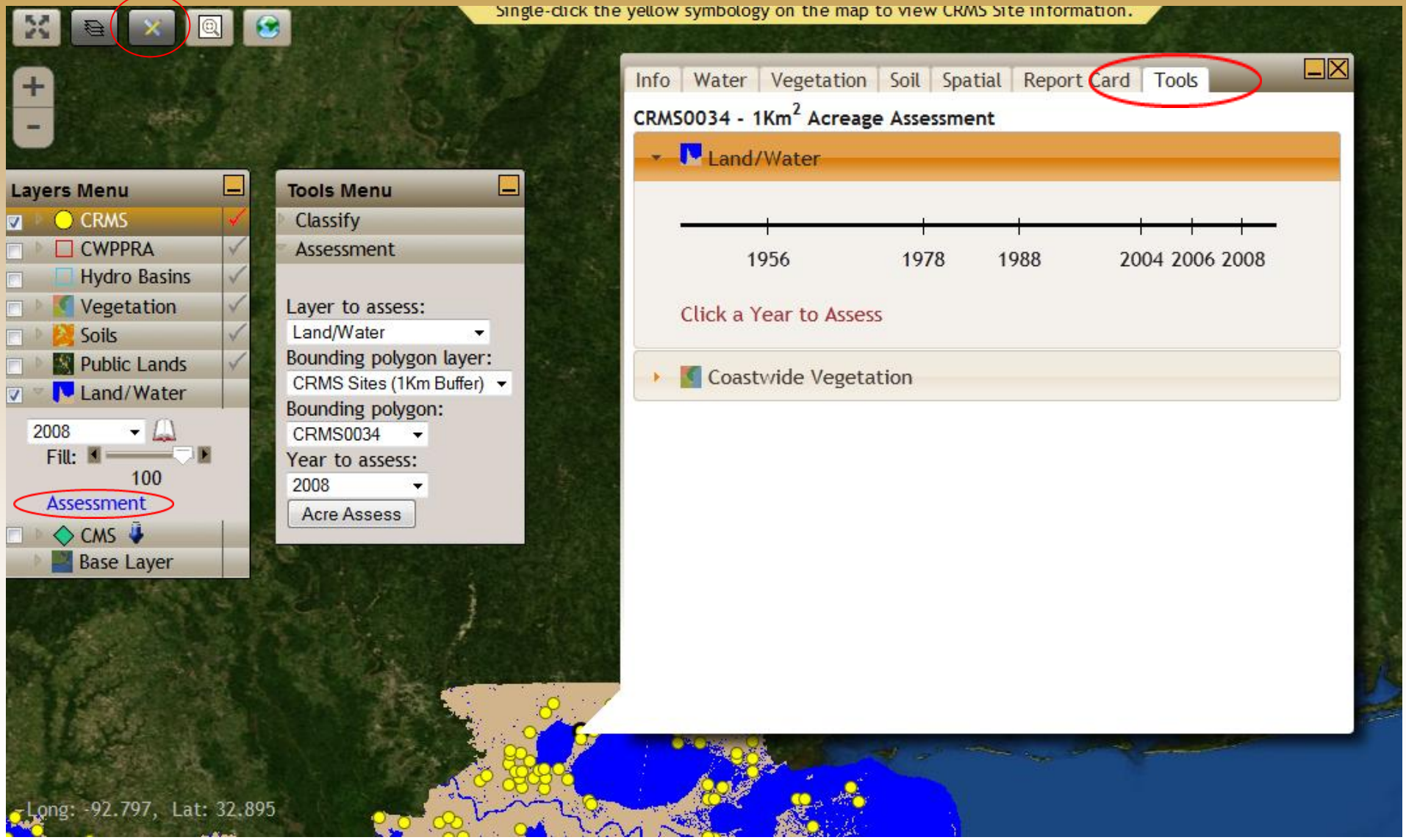


CRMS Viewer: Classification Tool

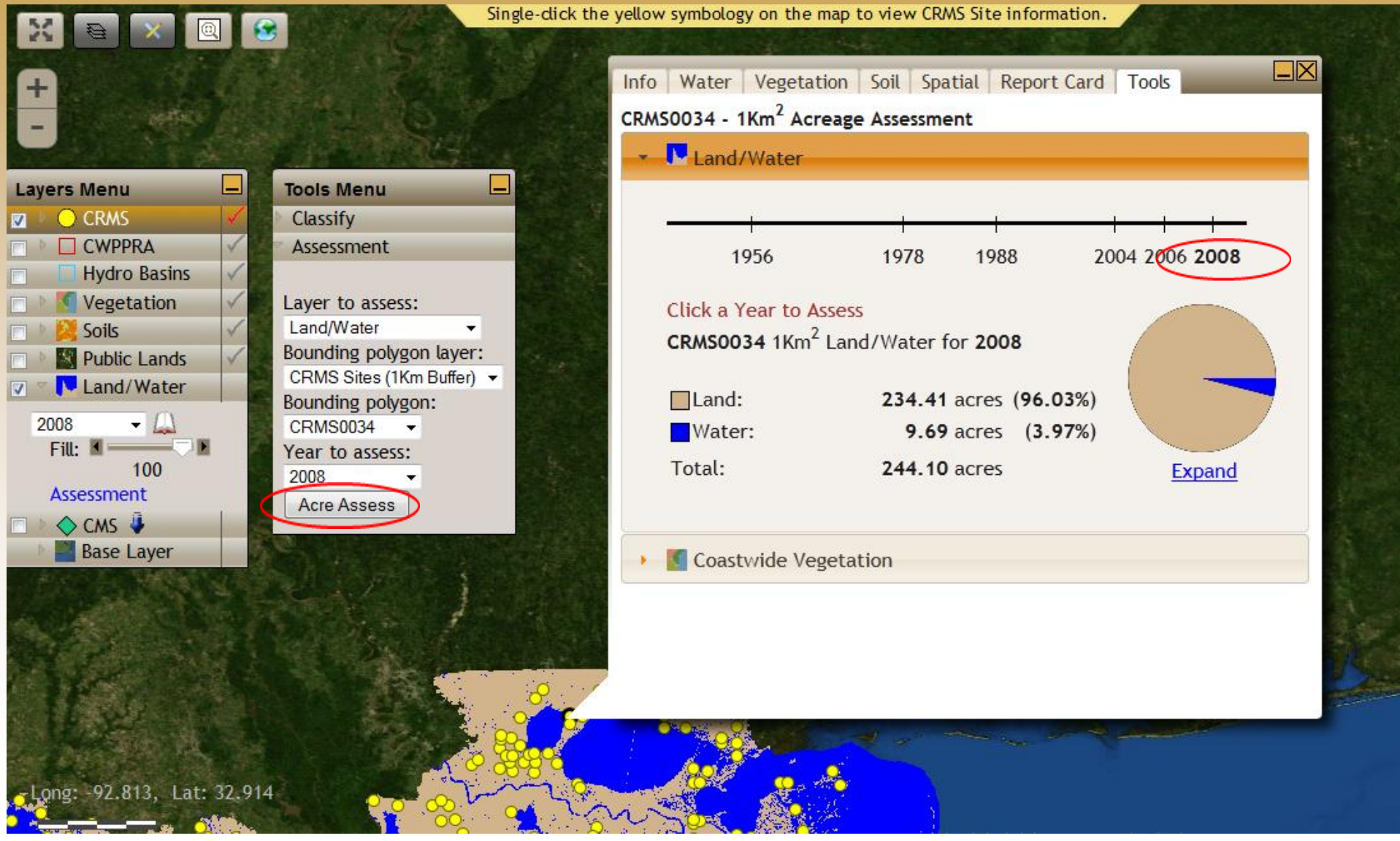




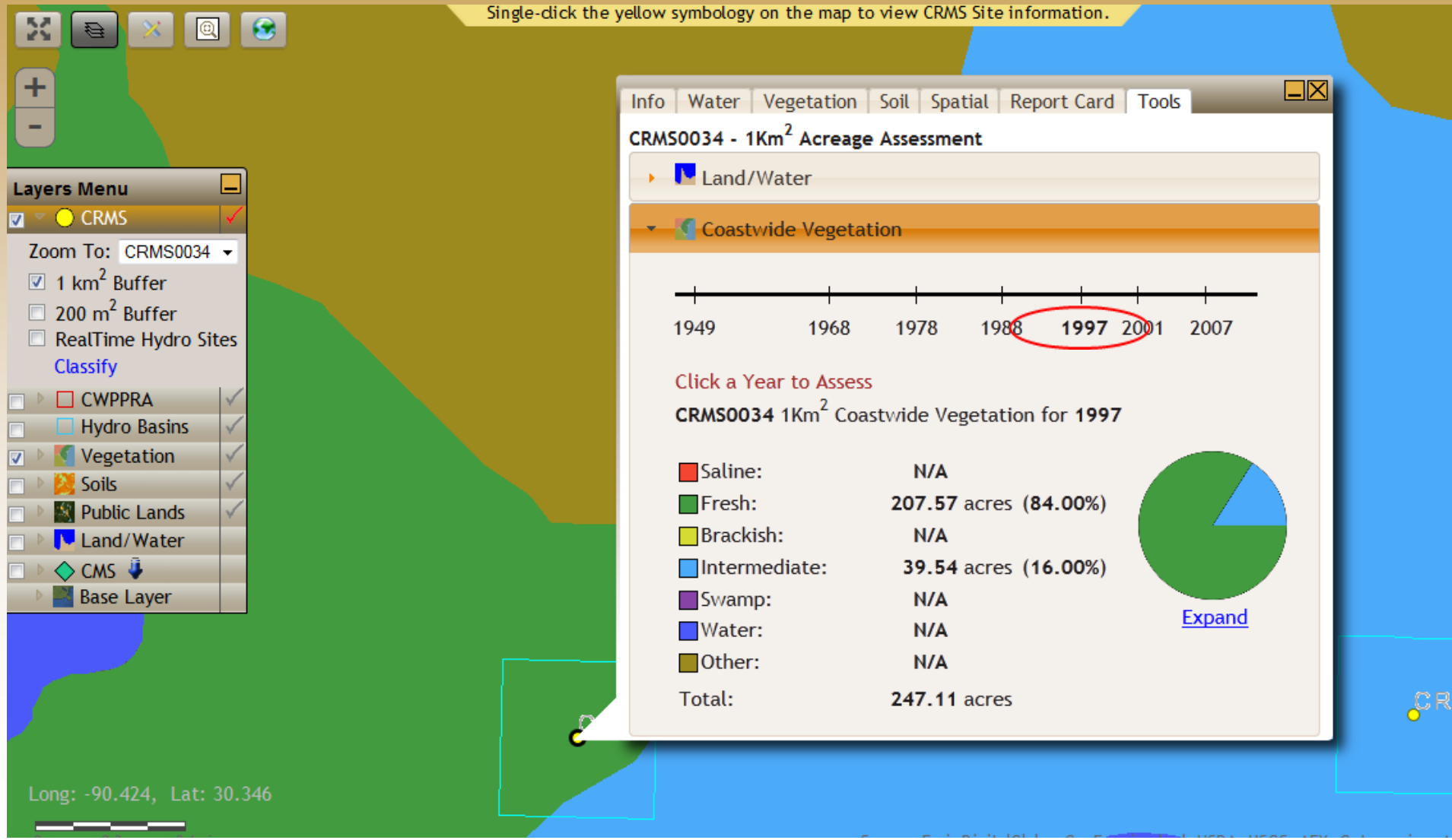
CRMS Viewer: Assessment Tool - Veg



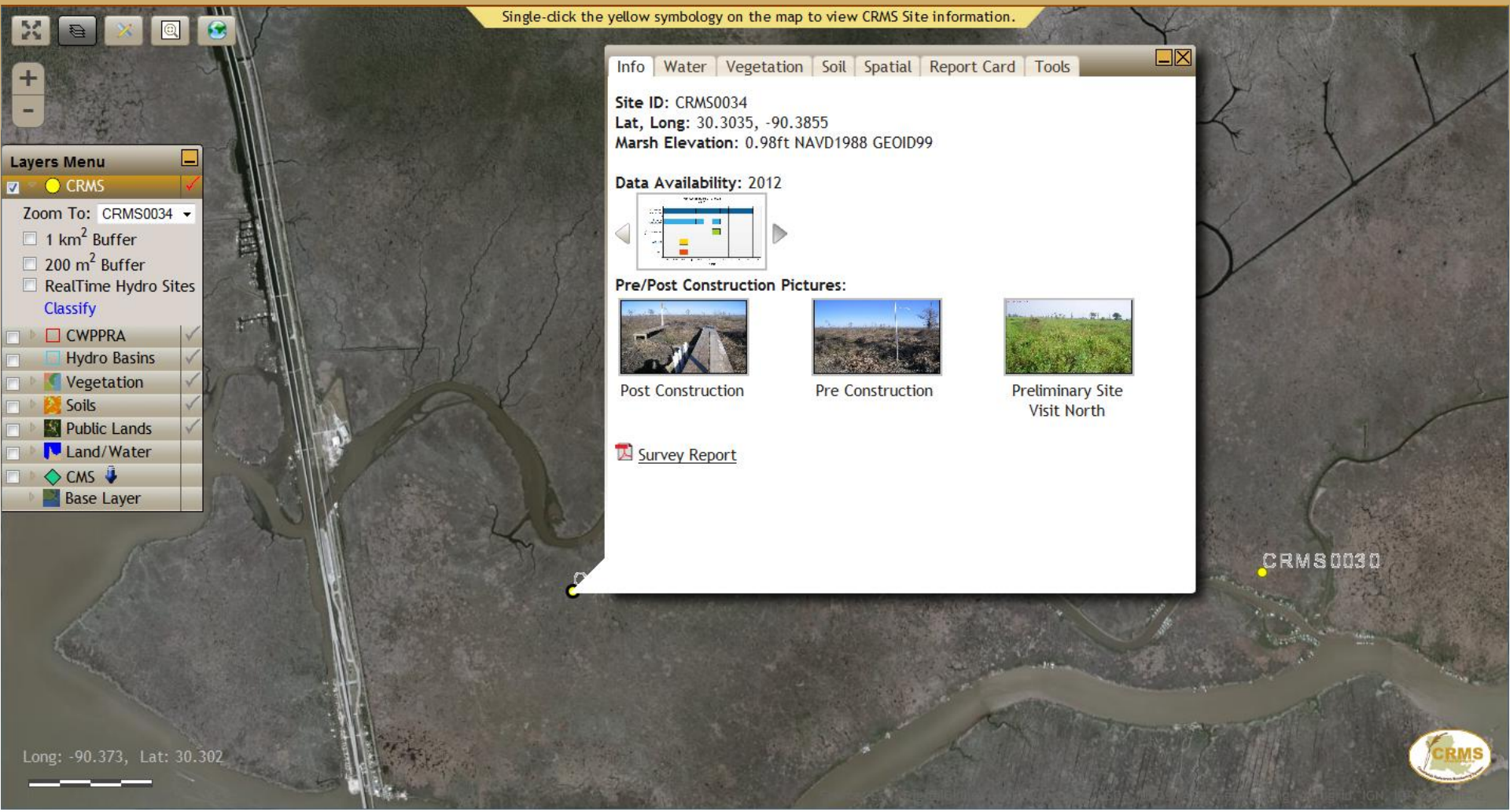
CRMS Viewer: Assessment Tool - Veg



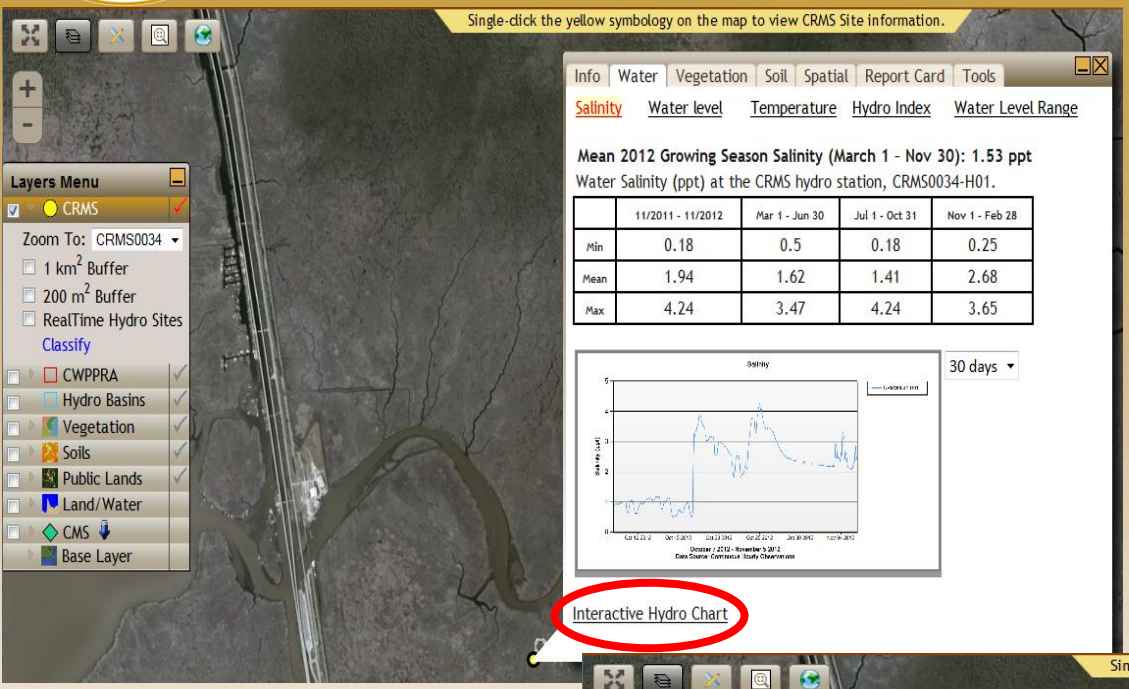
CRMS Viewer: Assessment Tool - Veg

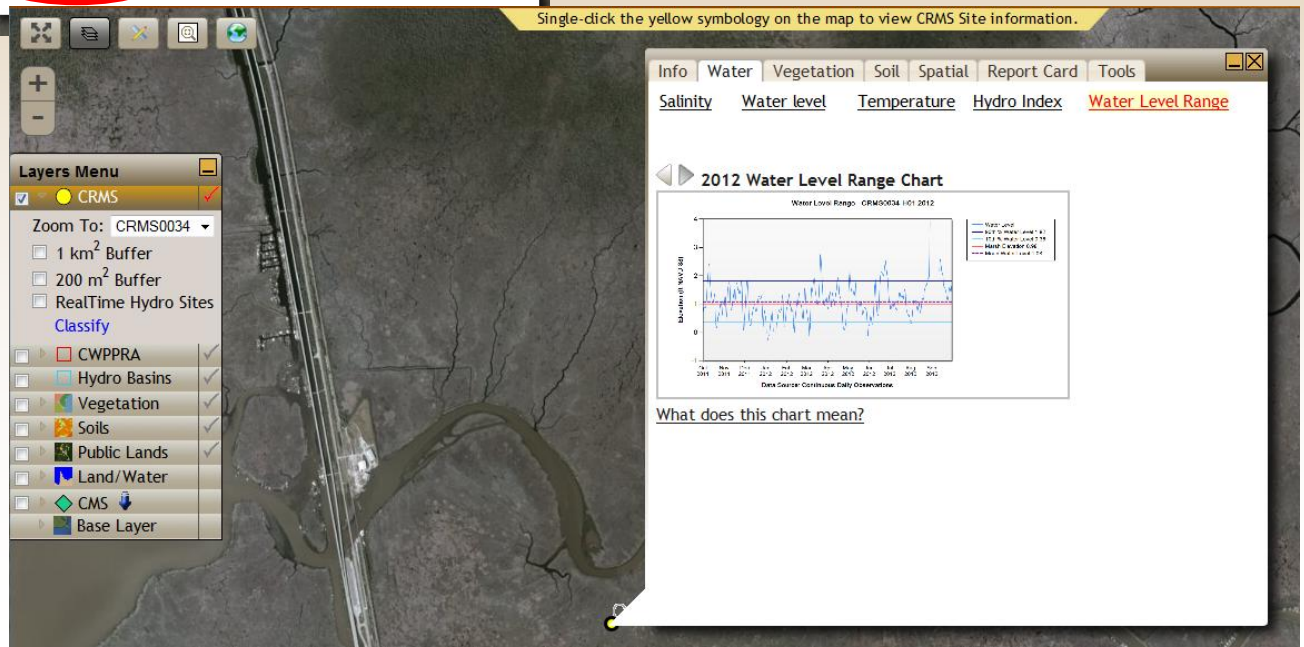


CRMS Viewer: CRMS Info



CRMS Viewer: CRMS Hydro Tab

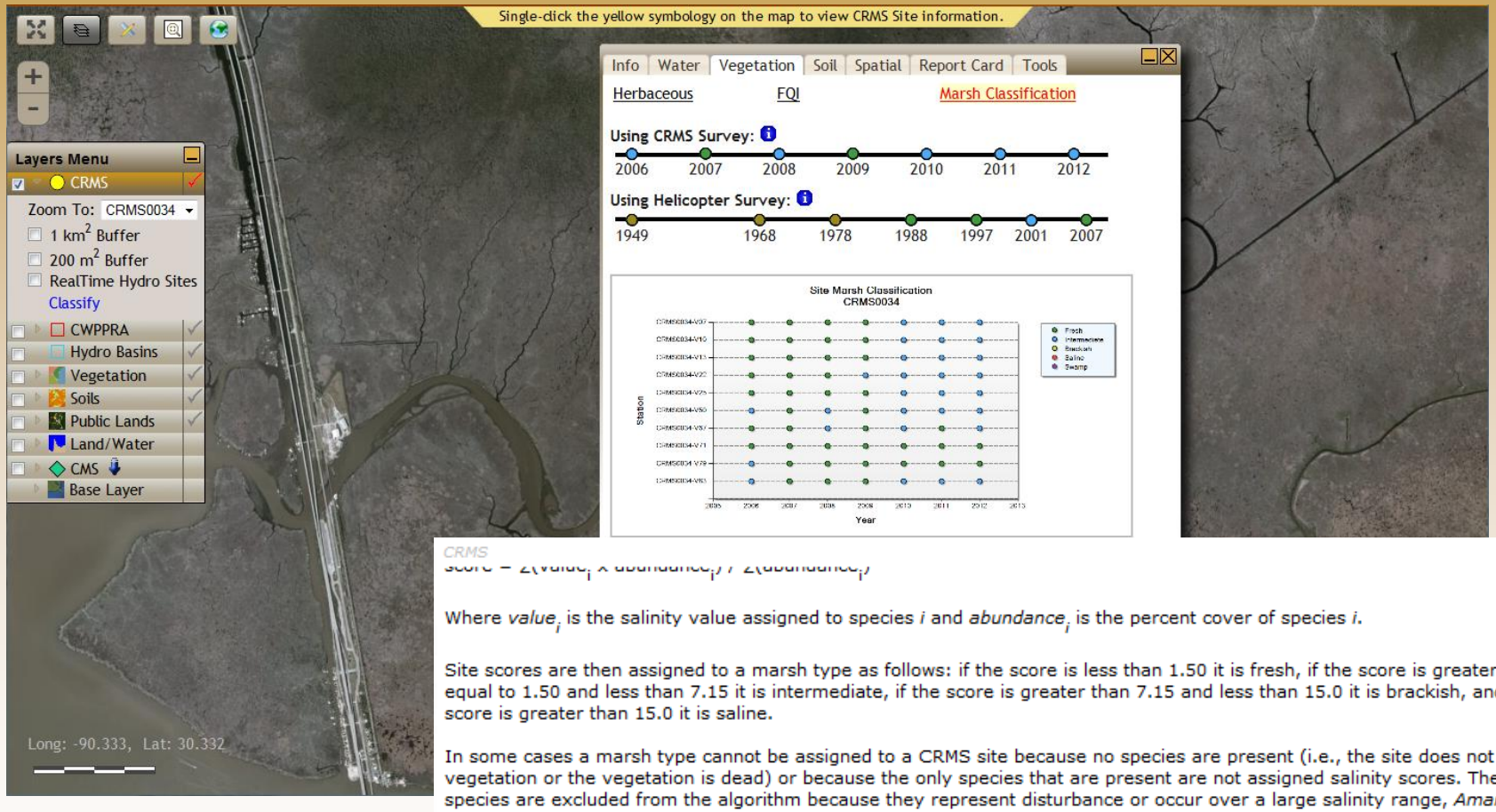




CRMS Viewer: CRMS Veg Tab

Marsh Classification

Colored year markers on time line result from averaging of site data within that year.



CRMS

MOVE CLOSE

Where $value_i$ is the salinity value assigned to species *i* and $abundance_i$ is the percent cover of species *i*.

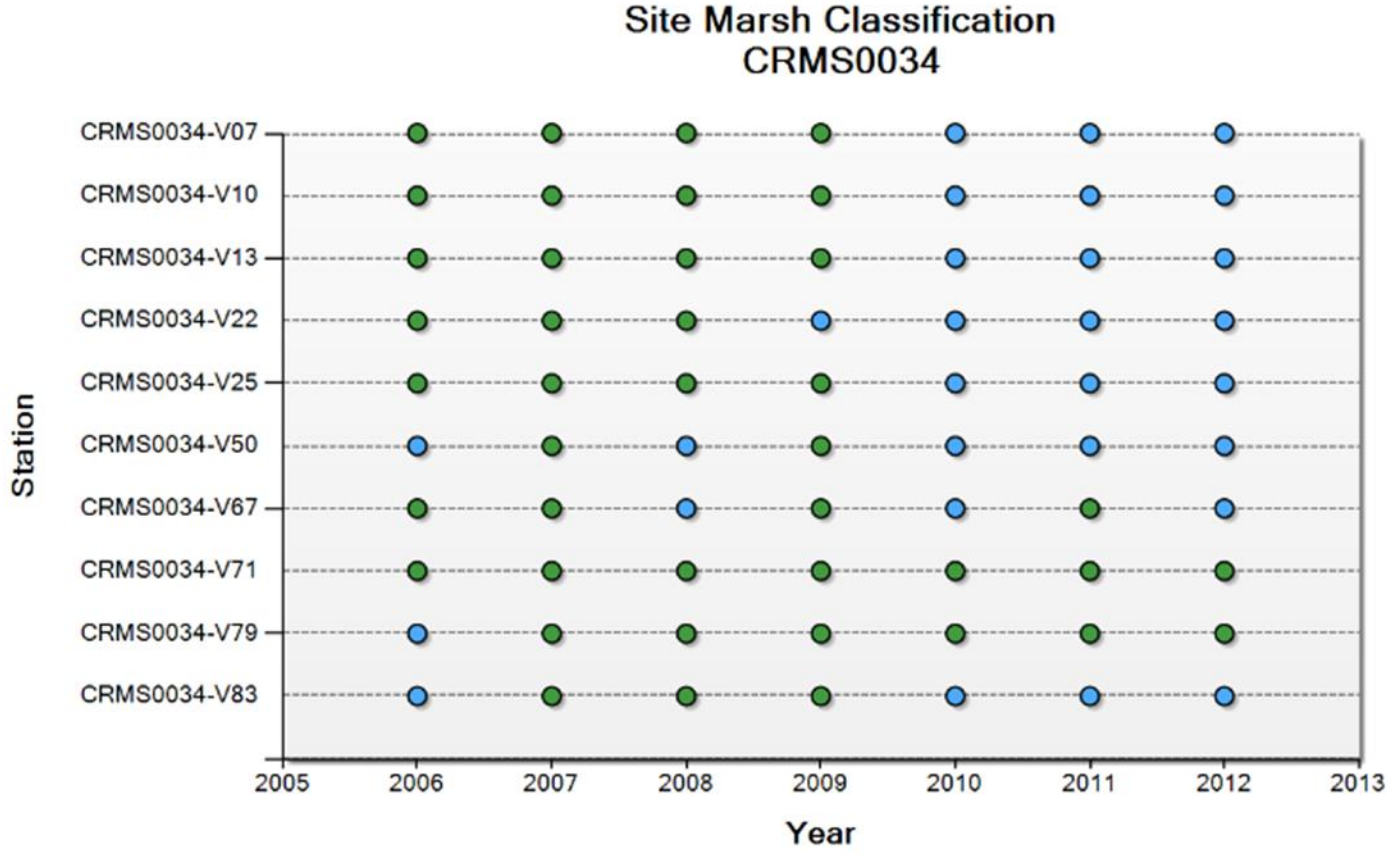
Site scores are then assigned to a marsh type as follows: if the score is less than 1.50 it is fresh, if the score is greater than or equal to 1.50 and less than 7.15 it is intermediate, if the score is greater than 7.15 and less than 15.0 it is brackish, and if the score is greater than 15.0 it is saline.

In some cases a marsh type cannot be assigned to a CRMS site because no species are present (i.e., the site does not contain vegetation or the vegetation is dead) or because the only species that are present are not assigned salinity scores. The following species are excluded from the algorithm because they represent disturbance or occur over a large salinity range, *Amaranthus australis, Cyperus odoratus, Echinochloa walteri, Eleocharis* sp., *Eupatorium capillifolium, Iva frutescens, Leptochloa fusca, Ludwigia* sp., *Lythrum lineare, Pluchea camphorata, Sesbania drummondii, Sesbania herbacea, Solidago sempervirens, Symphyotrichum subulatum, Symphyotrichum tenuifolium,and Vigna luteola.*

Visser, J.M., Sasser, C.E., Chabreck, R.H., Linscombe, R.G. 2002. The impact of a severe drought on the vegetation of a subtropical estuary. Estuaries 25: 1184-1195.

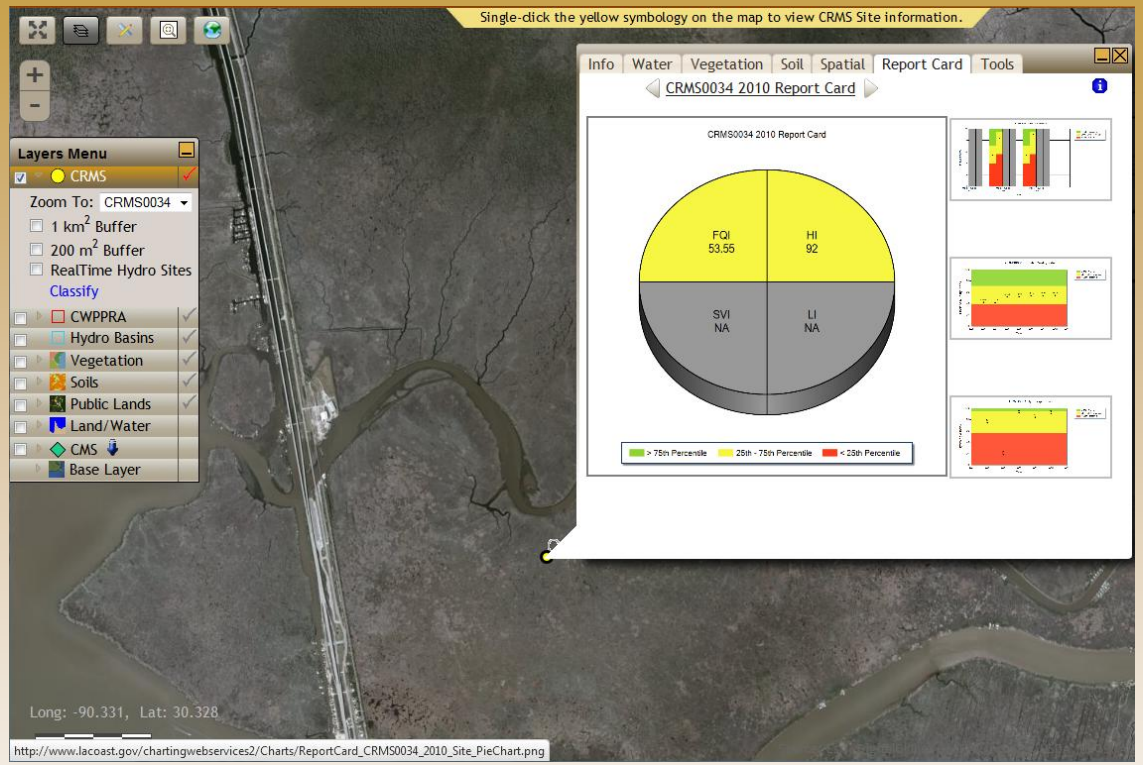
- Saline
- Intermediate
- Swamp
- Brackish
- Fresh
- Other

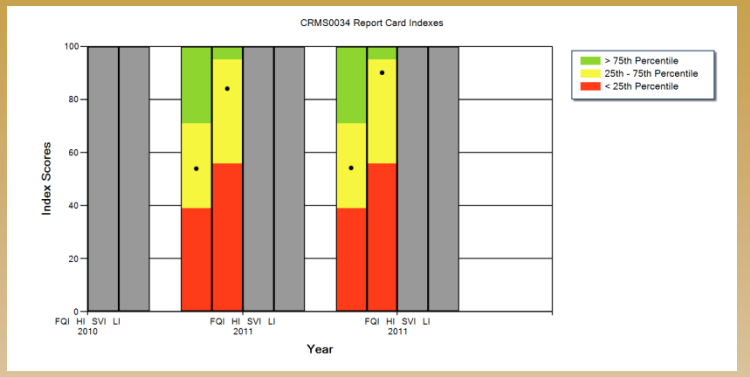
CRMS Viewer: CRMS Veg Tab

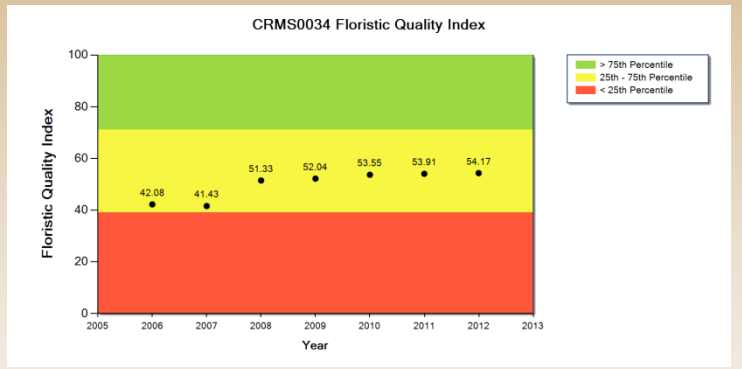


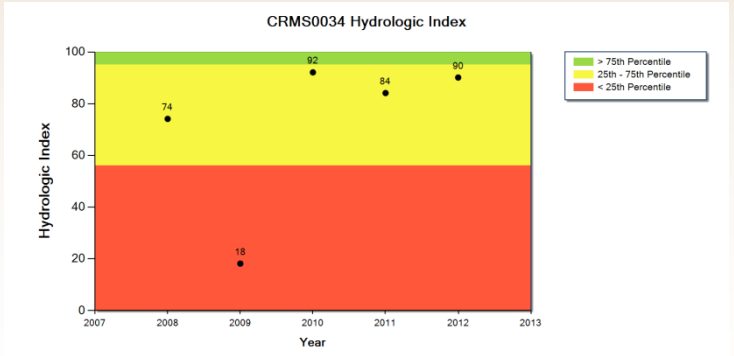
Download Data

CRMS Viewer: CRMS Report Card Tab



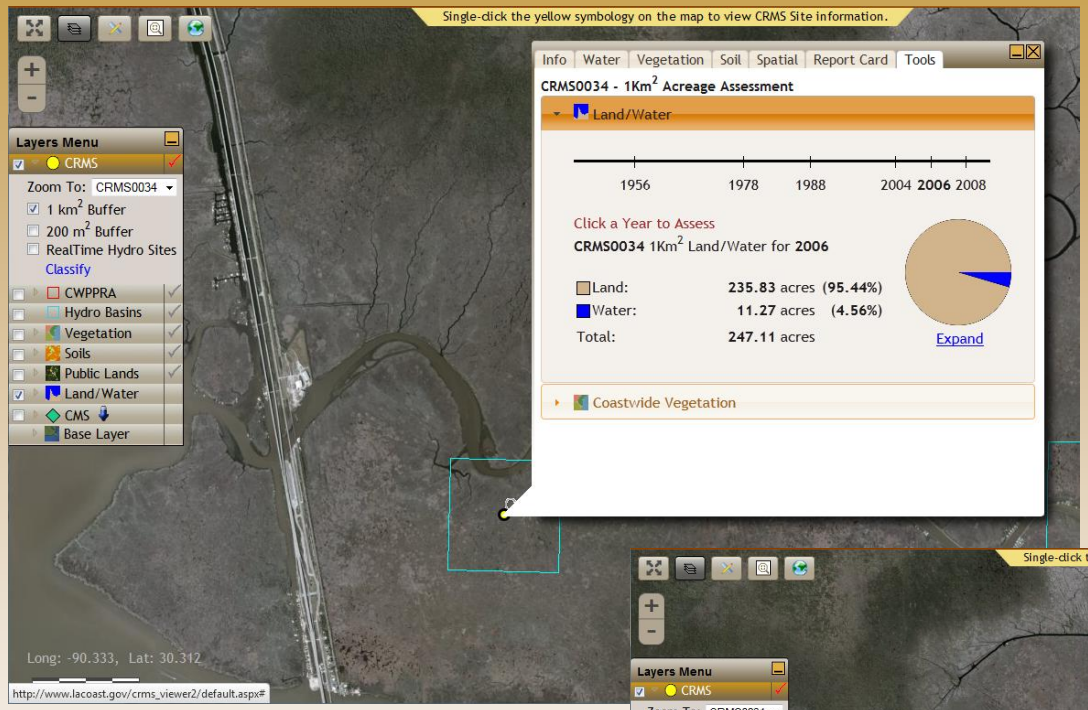


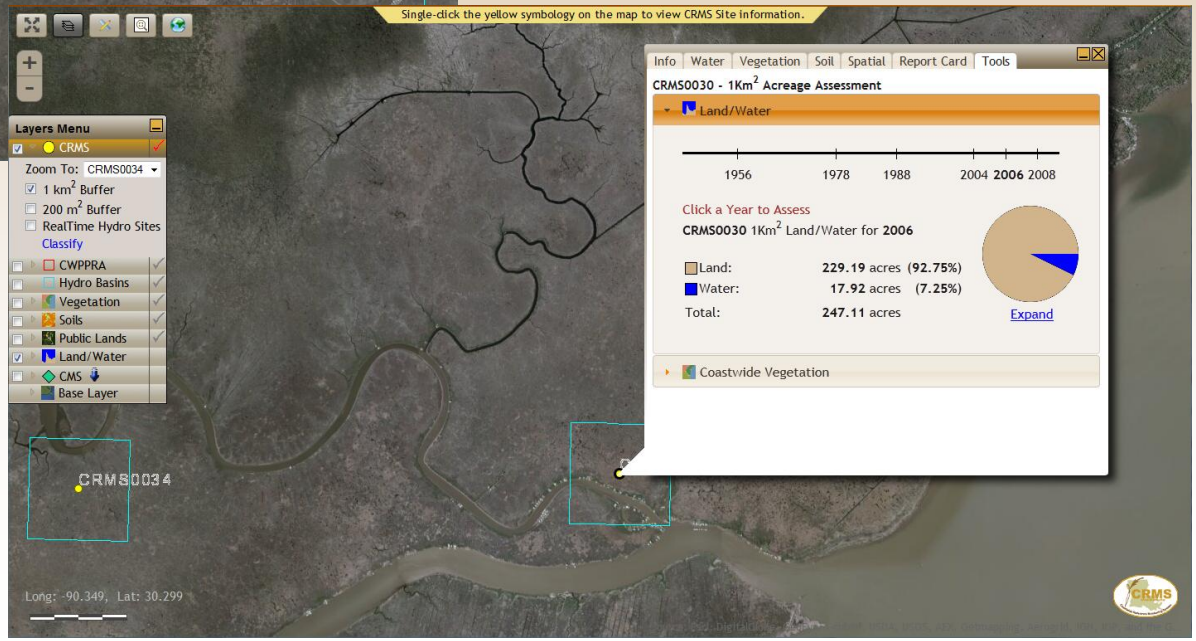




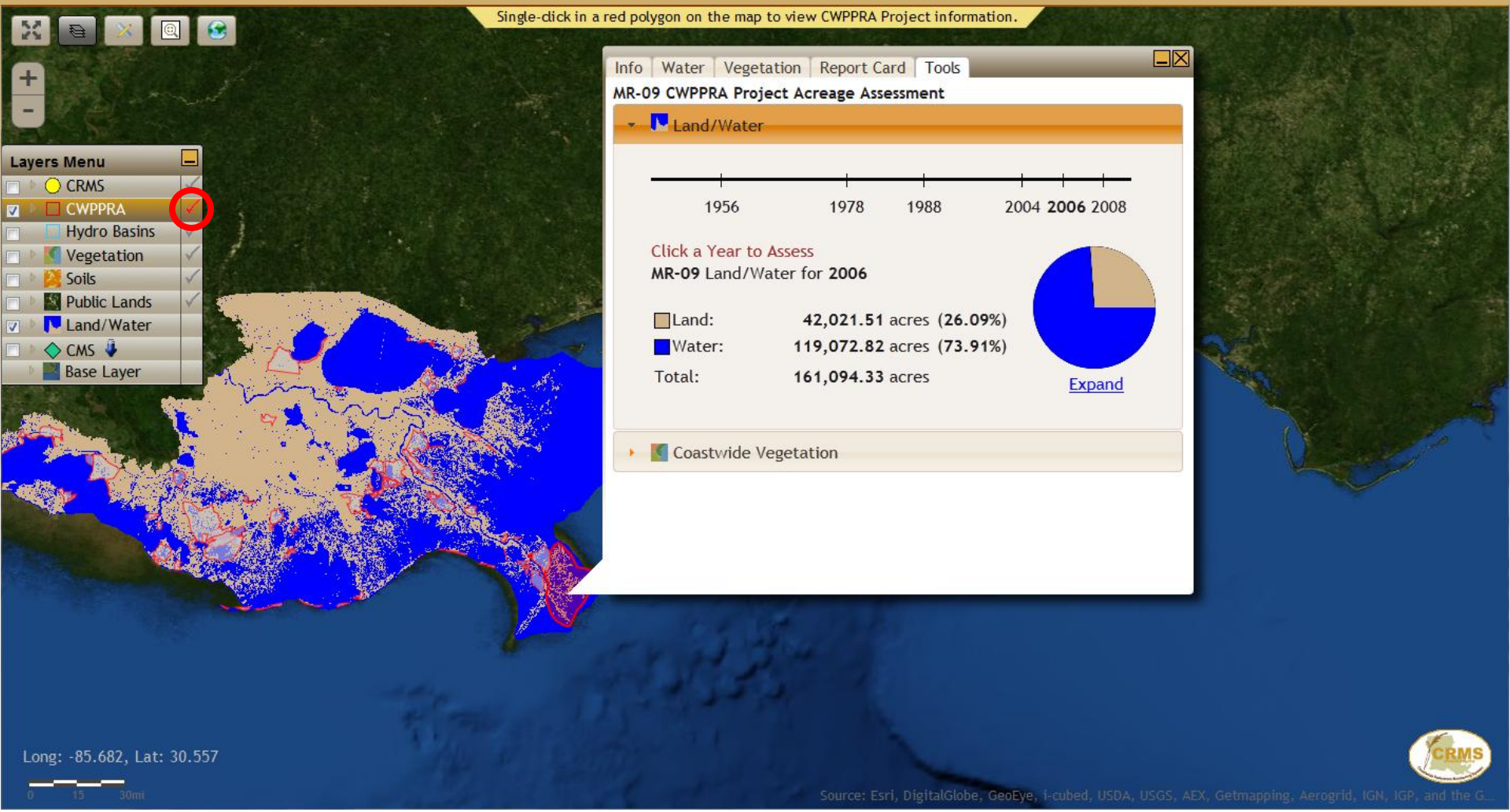
CRMS Viewer: CRMS Change Clicked Site

Tools: Changing selected site no longer changes bubble context

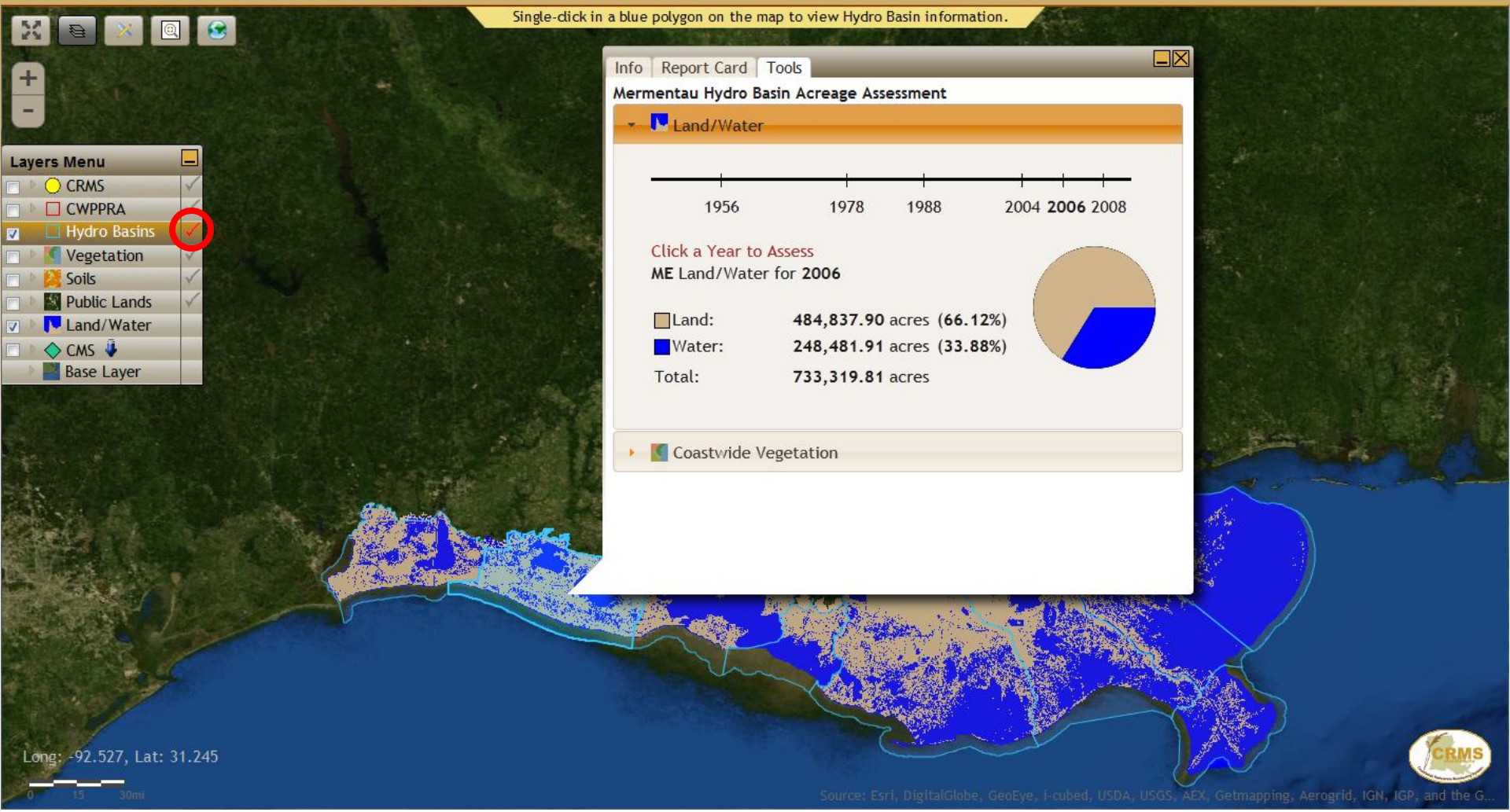




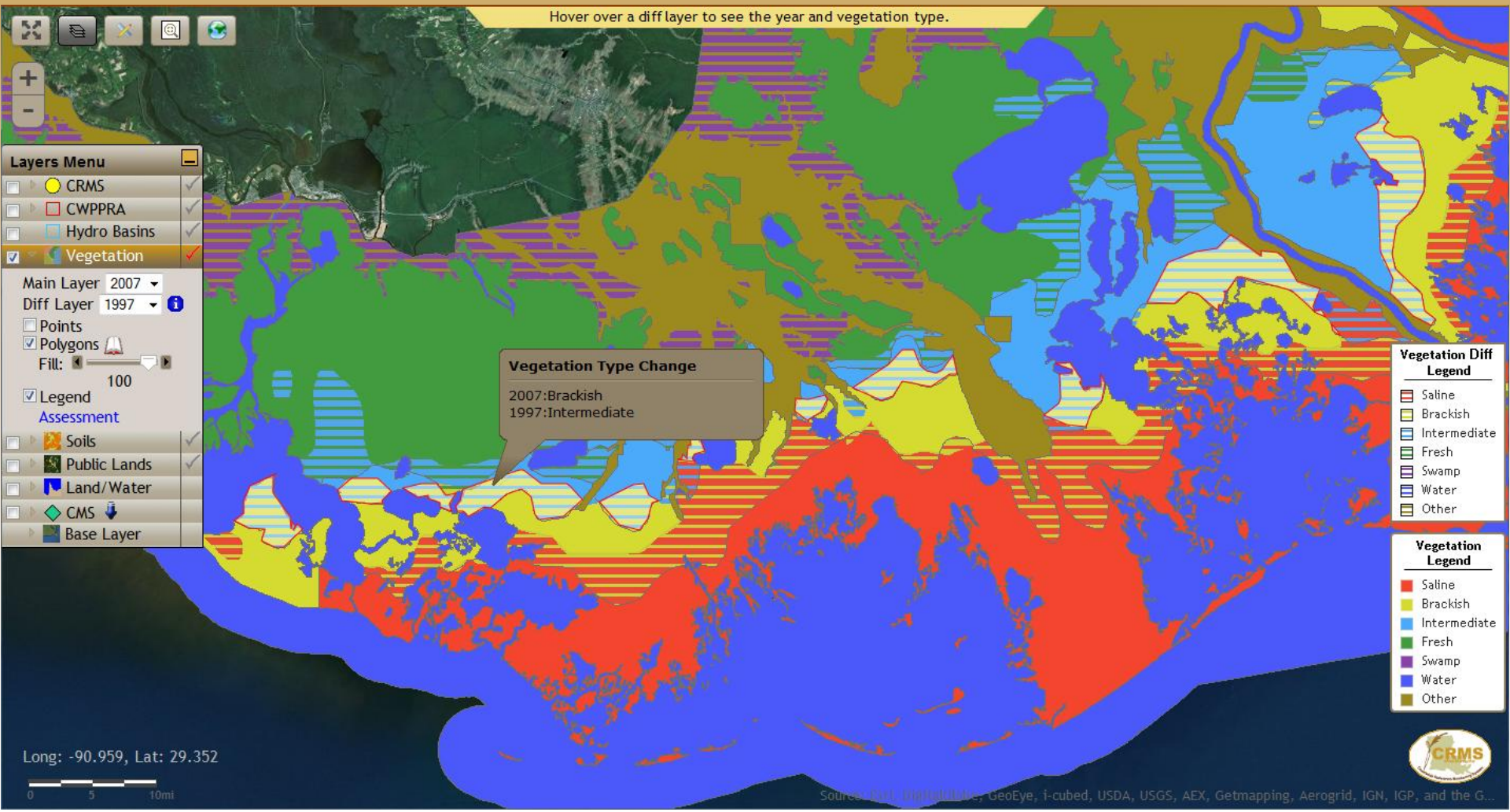
CRMS Viewer: CWPPRA Layer (when active)



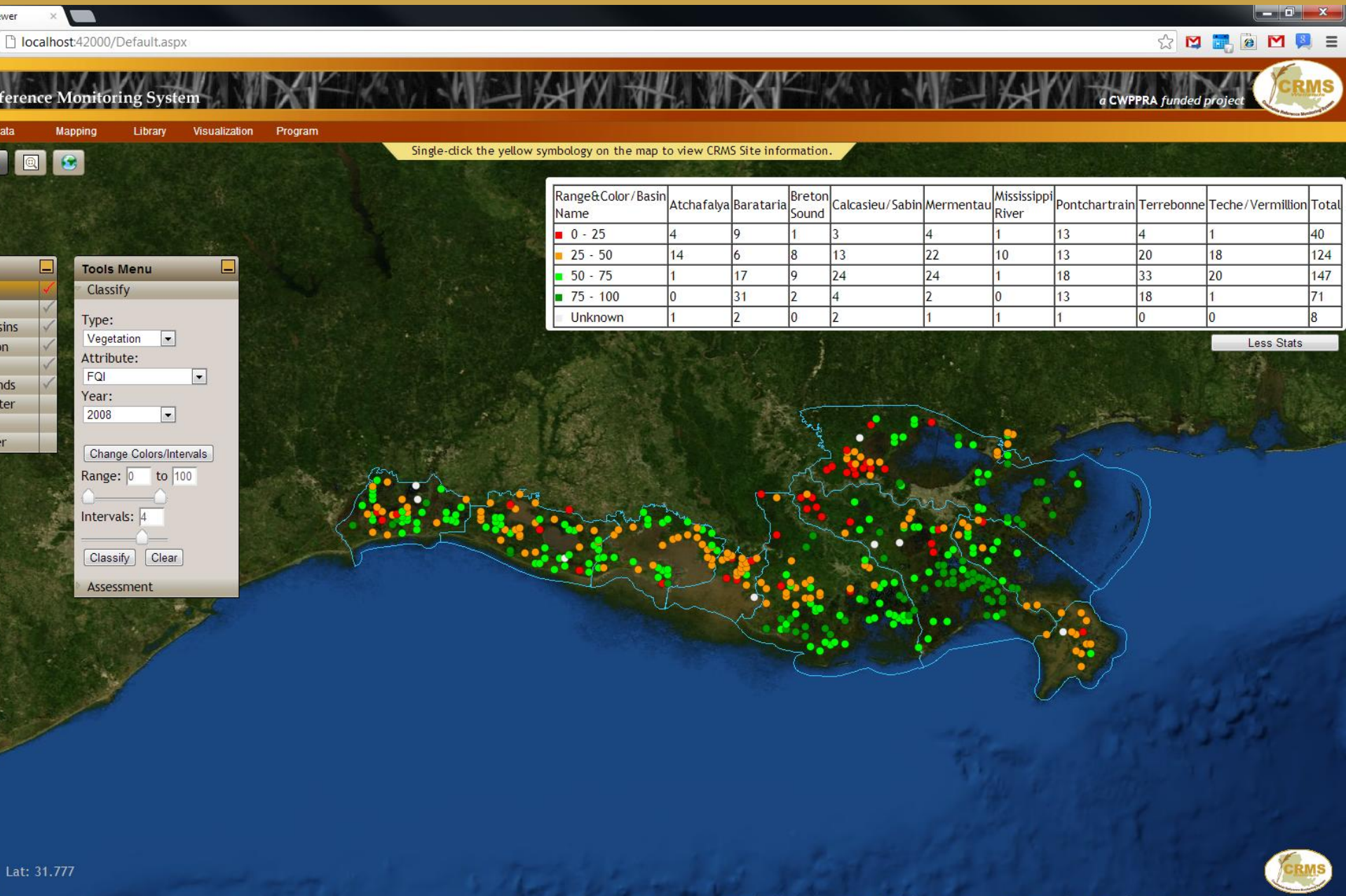
CRMS Viewer: Basins Tools Tab



CRMS Viewer: Veg Difference Improvement



Staged: Numeric break down by basin

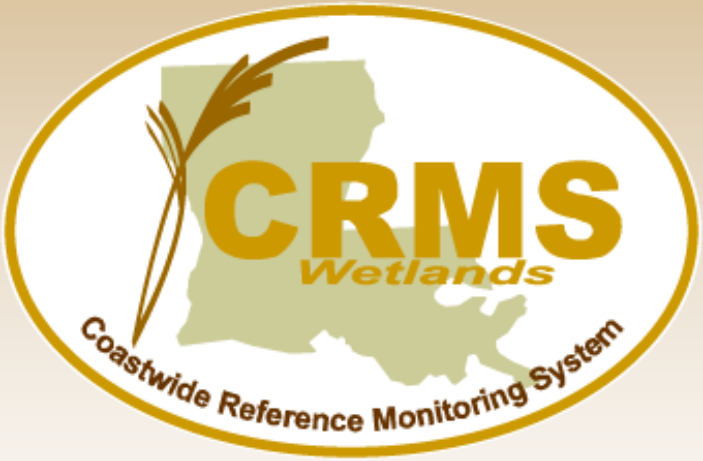


Range&Color / Basin Name	Atchafalya	Barataria	Breton Sound	Calcasieu / Sabin	Mermentau	Mississippi River	Pontchartrain	Terrebonne	Teche / Vermillion	Total
0 - 25	4	9	1	3	4	1	13	4	1	40
25 - 50	14	6	8	13	22	10	13	20	18	124
50 - 75	1	17	9	24	24	1	18	33	20	147
75 - 100	0	31	2	4	2	0	13	18	1	71
Unknown	1	2	0	2	1	1	1	0	0	8

Allow user to customize the mapping environment, generate a link which can then be shared with others.

Questions / Comments

Louisiana's Coastwide Reference Monitoring System (CRMS) – *Wetlands*



Agency Roadshows
Feb/March 2013

Analytical Teams

Last year we presented the CRMS report card. This year we focused on fine tuning and developing new tools.

- **Finalizing visualizations**
- **Refining indices**
- **Developing new metrics**
- **Considering new tools to evaluate projects**

Floristic Quality Index

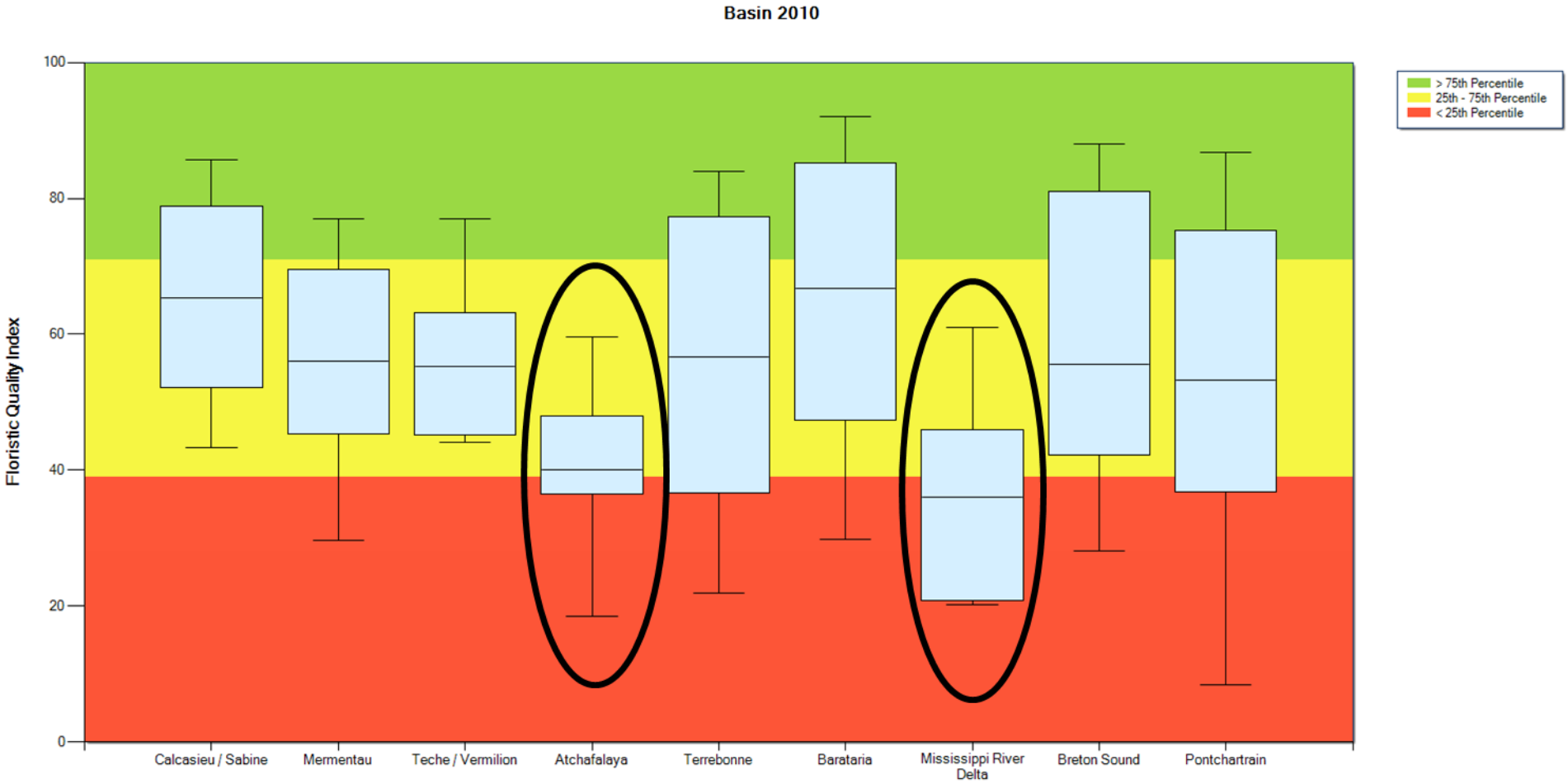
Index	Description
Floristic Quality Index (FQI)	Field collected species composition, percent cover, and the species' tolerance to disturbance and conservatism to a habitat are used to assess vegetation quality.

CC score	Description
0	Invasive plant species
1–3	Plants that are opportunistic users of disturbed sites
4–6	Plants that occur primarily in less vigorous coastal wetland communities
7–8	Plants that are common in vigorous coastal wetland communities
9–10	Plants that are dominants in vigorous coastal wetland communities

Cretini, K.F., Visser, J.M., Krauss, K.W., and Steyer, G.D. (2011) CRMS vegetation analytical team framework-Methods for collection, development, and use of vegetation response variables. U.S. Geological Survey Open-File Report 2011–1097, 60 p.

Cretini, K.F., Visser, J.M., Krauss, K.W., and Steyer, G.D. (2012). Development and use of floristic quality index for coastal Louisiana marshes. Environmental Monitoring and Assessment 184:2389-2403.

Floristic Quality Index



Additional Vegetation Metrics

EXAMPLE PROJECT GOALS:

Evaluate the condition of the established emergent and planted vegetation on the terraces.

Maintain or increase the abundance of plant species typical of a freshwater and intermediate marsh.

Promote the re-establishment of emergent marsh.

Establish emergent wetland vegetation in shallow open water areas.

Maintain existing intermediate and brackish vegetation communities.

Vegetation Volume Index
&
Vegetation Community Salinity

Vegetation Volume

WORK IN PROGRESS:

- **Quantifies the AMOUNT of vegetation, without consideration of vegetation type or quality**

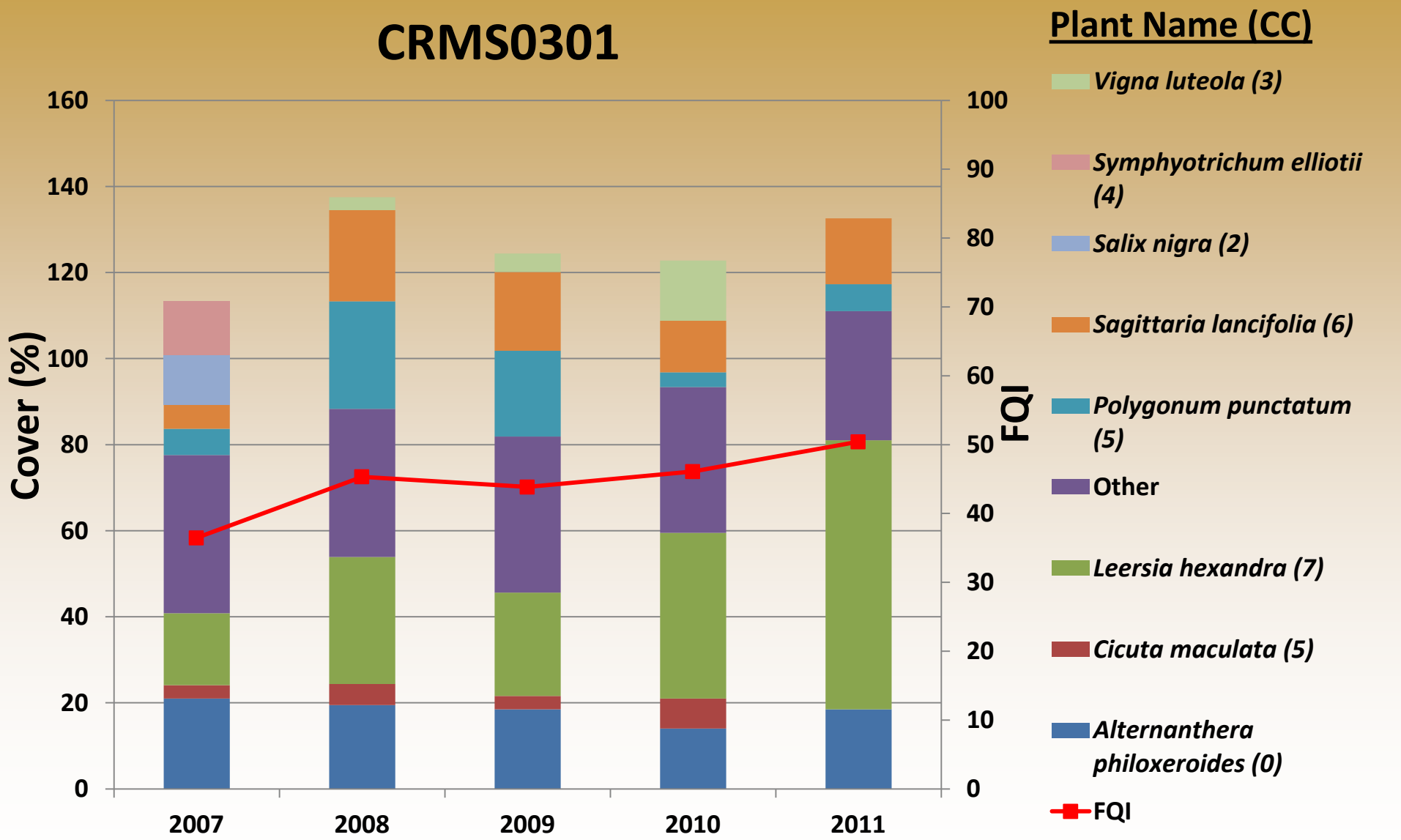
- **Sum of the volume of individual vegetation layers (herbaceous, shrub, trees, carpet)**

  Vegetation Volume (m^3) = [(herb layer area (m^2) * herb height (m)) + (shrub layer area (m^2) * shrub height (m)) + (tree layer area (m^2) * tree height (m)) + (carpet layer area (m^2) * carpet height (m))]

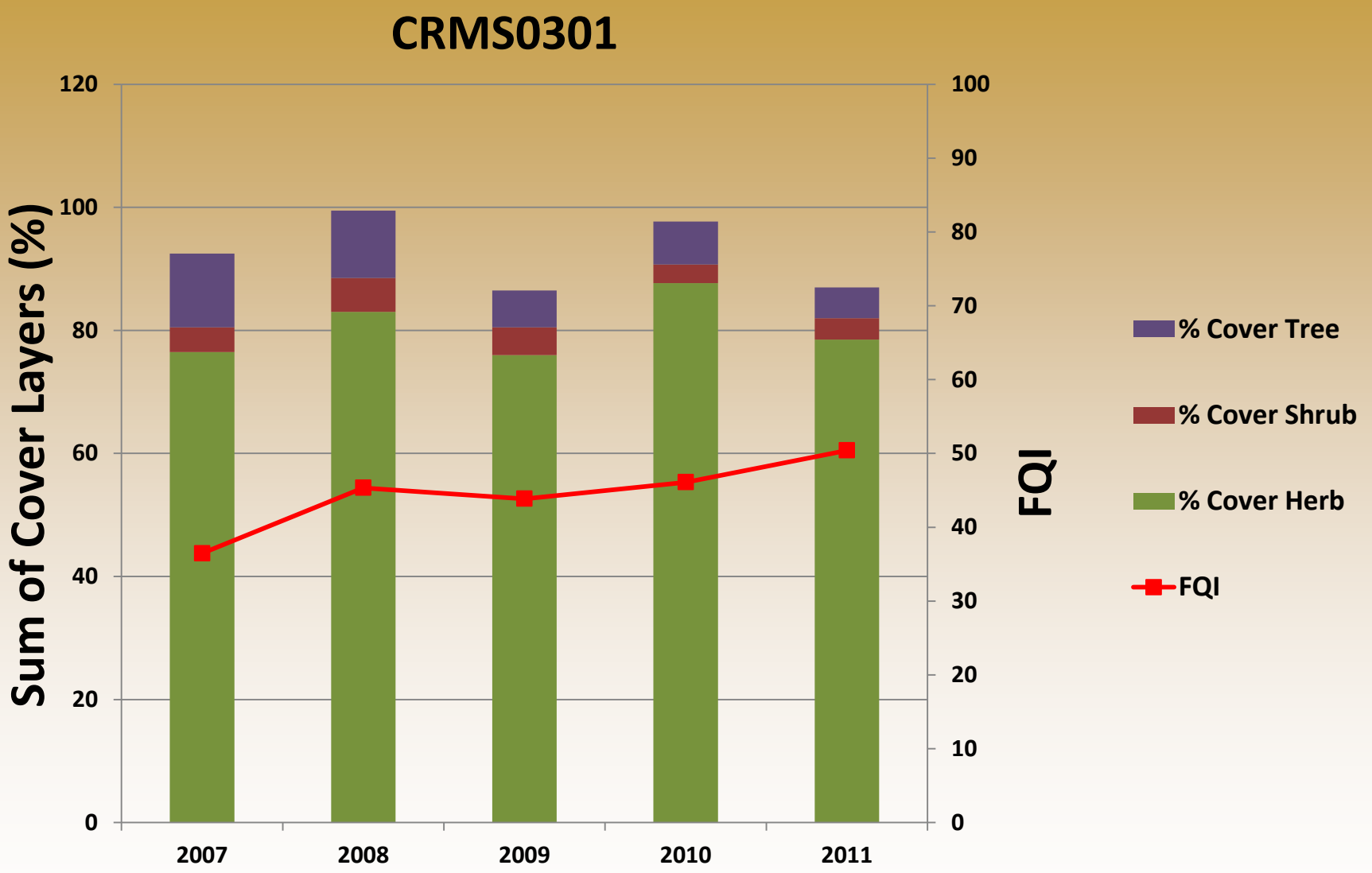
- **All volumes in a particular marsh type are assigned a rank in a normalize distribution. This "rank" is the VVI score (0-100).**

- **Index scoring would be the same as HI & FQI >75% would be green and <25% would be red**

Typical FQI Chart

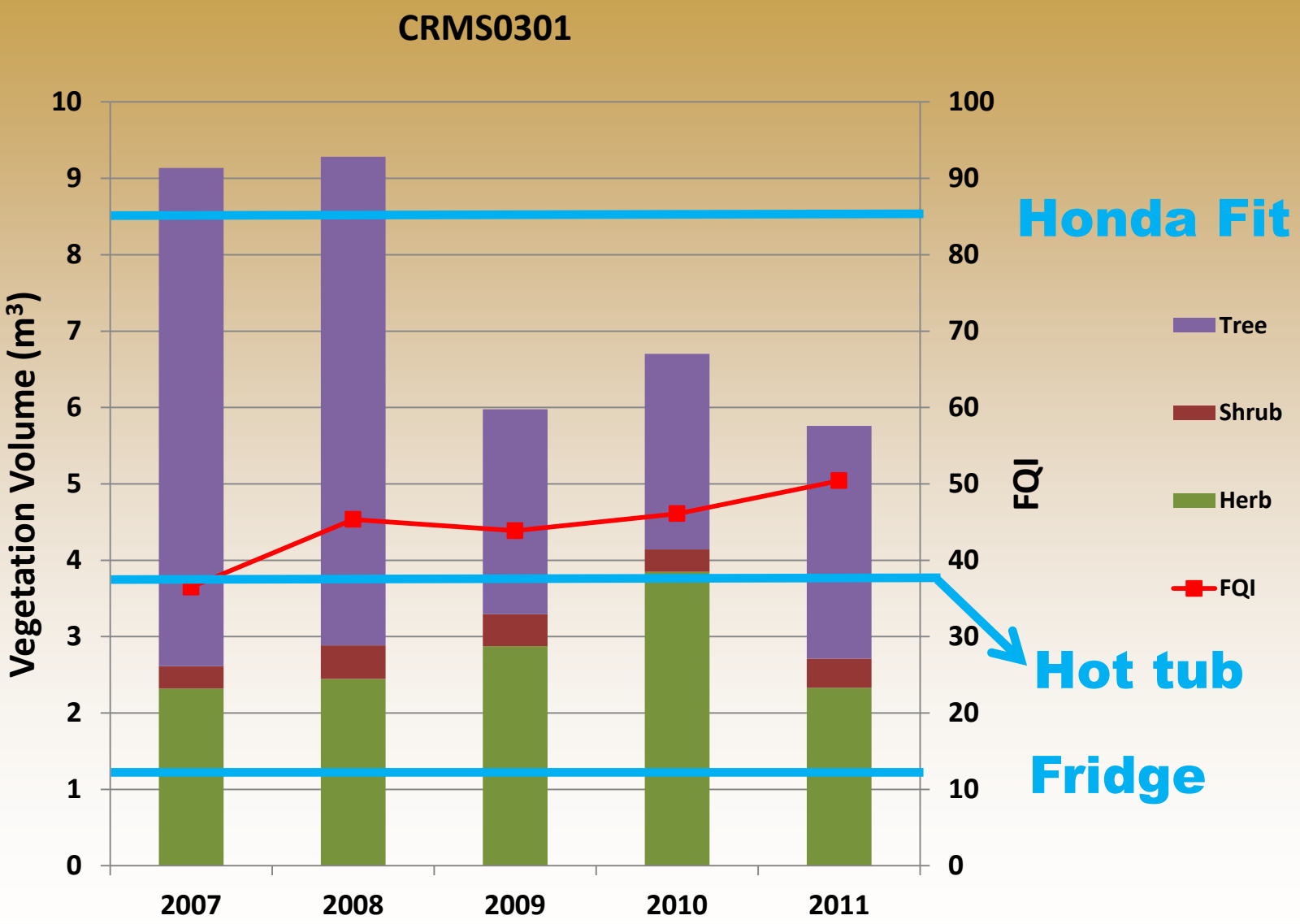


Vegetation Cover by Layer

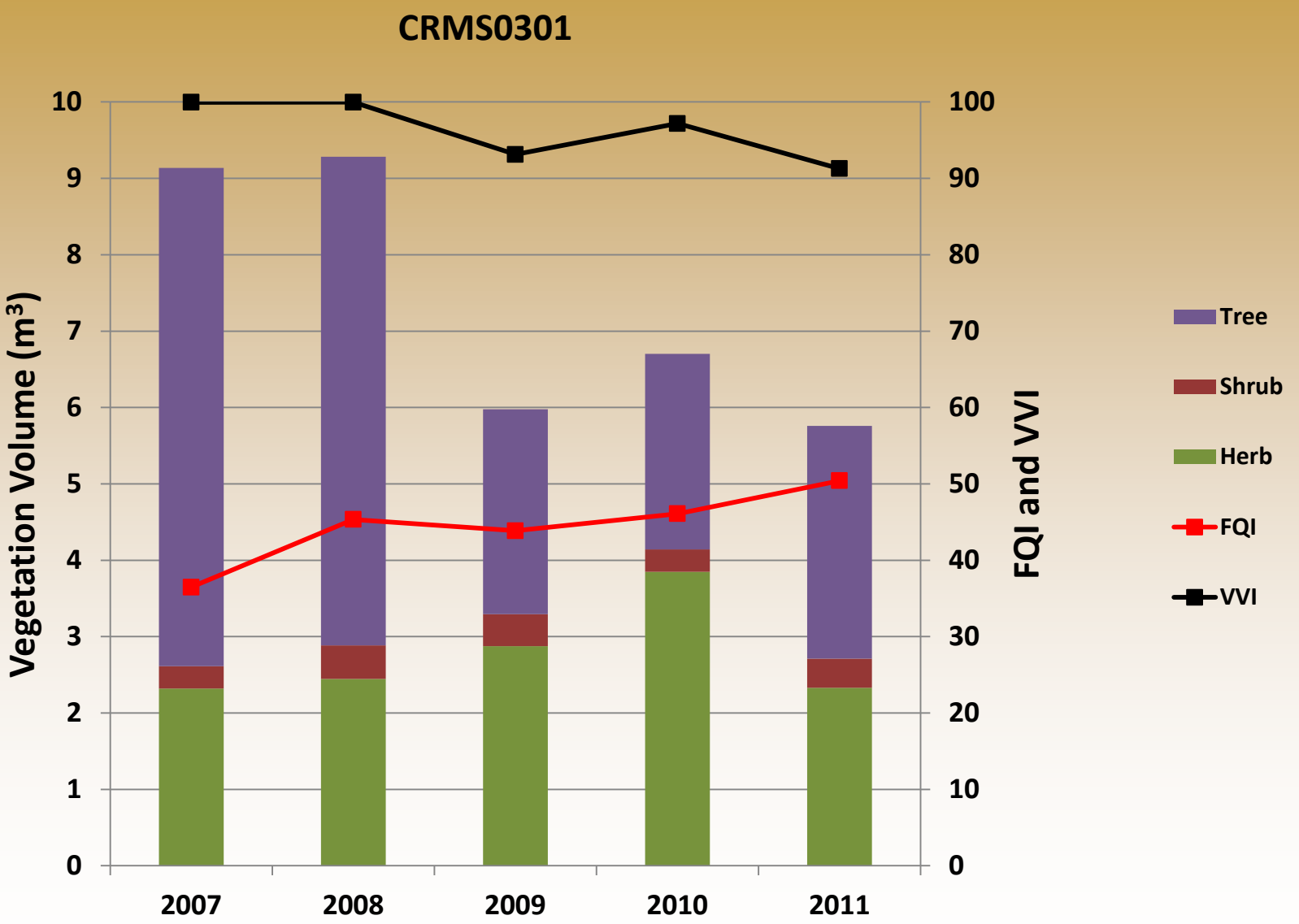


Layer cover * layer height

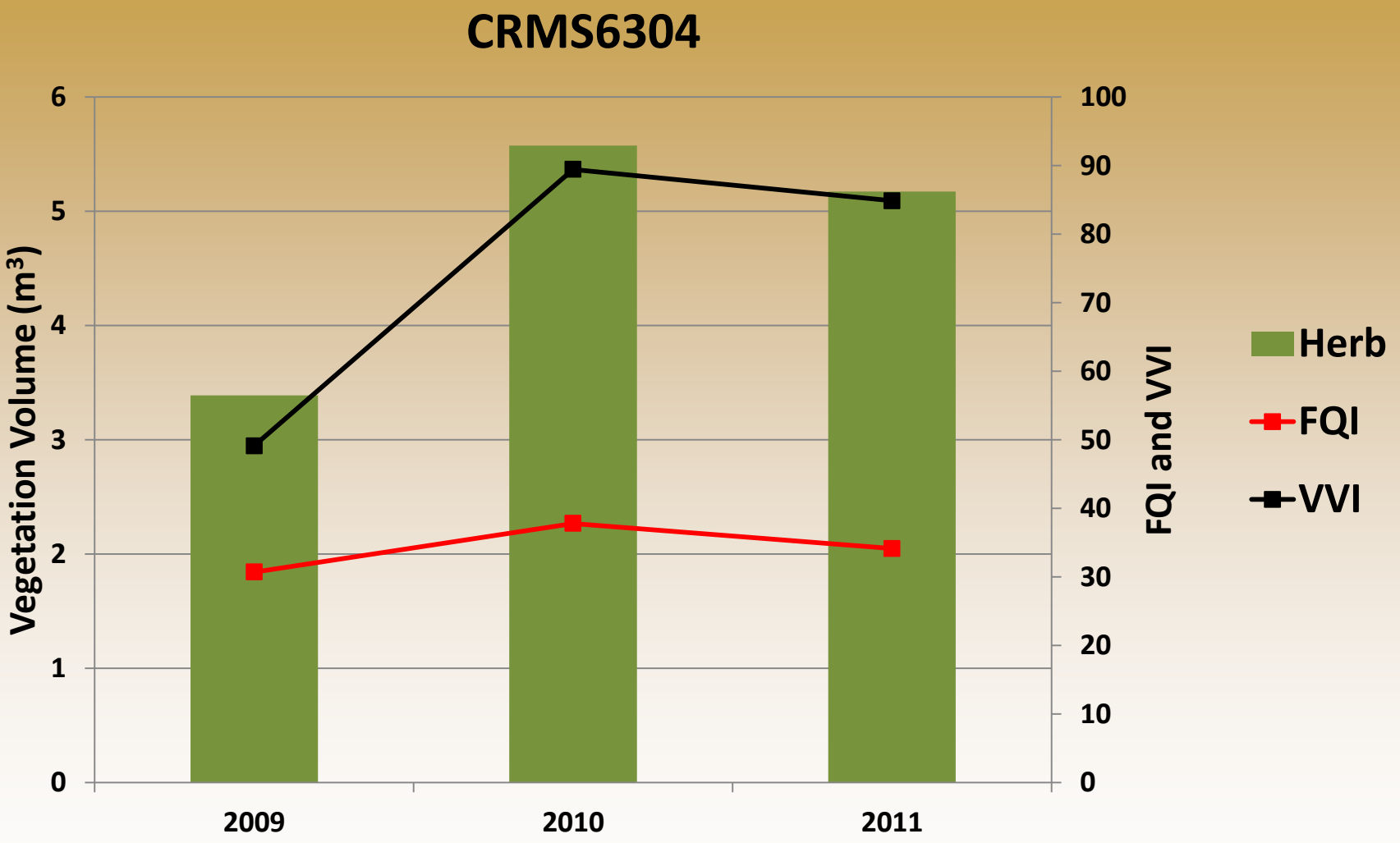
Vegetation Volume



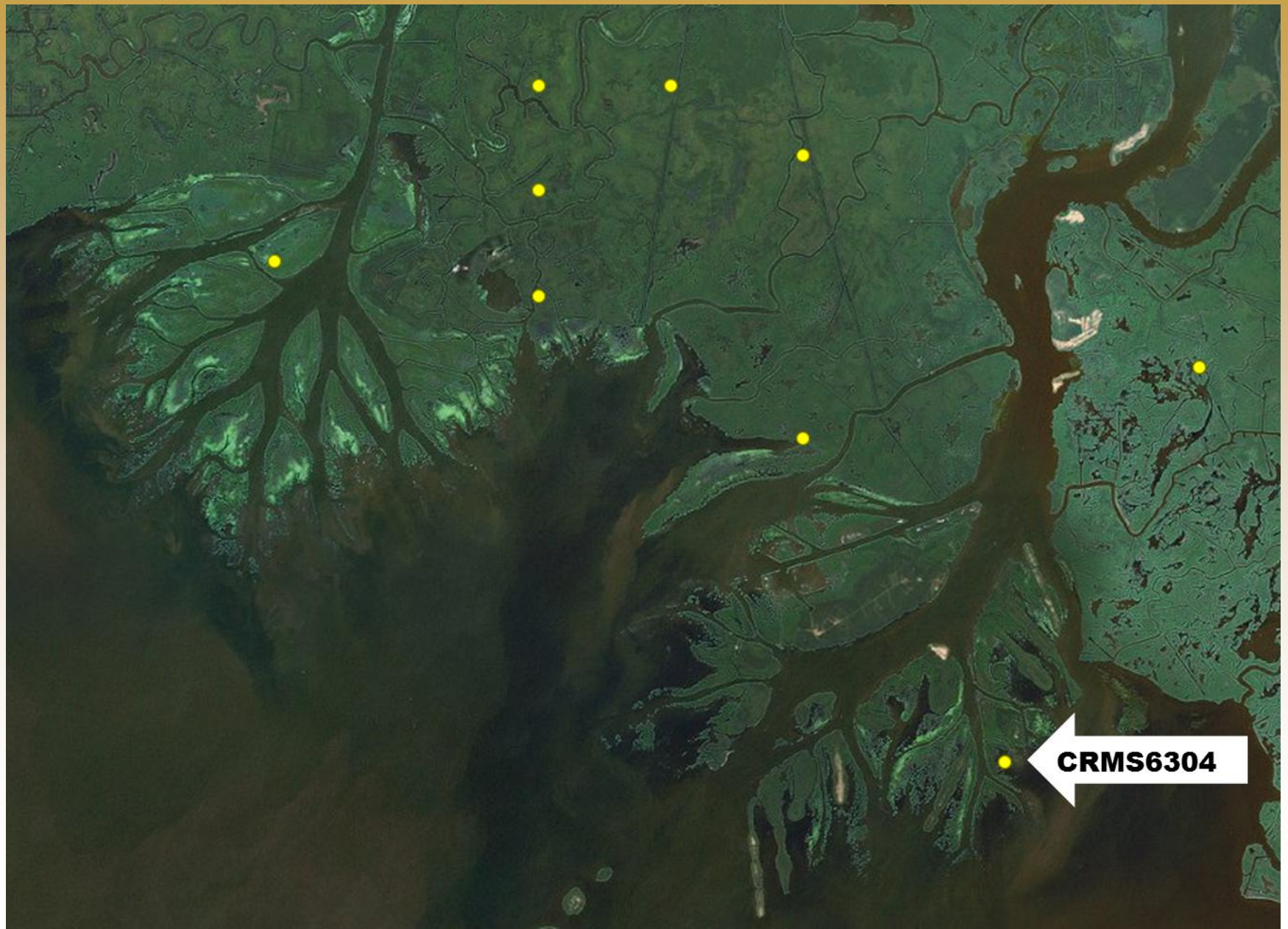
Vegetation Volume Index



Vegetation Volume Index



Vegetation Volume Index

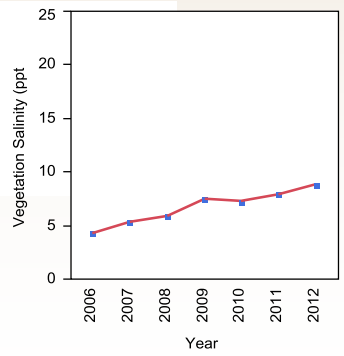


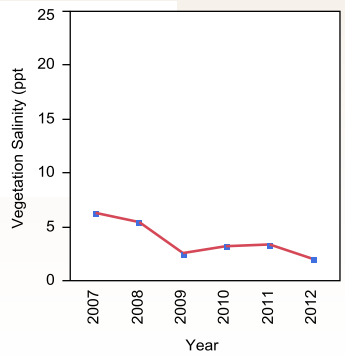
Vegetation Community Salinity

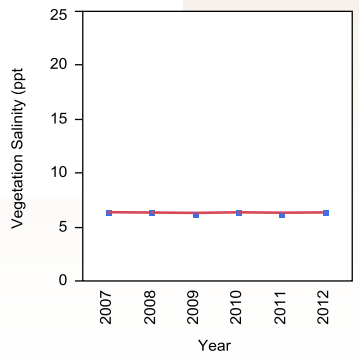
Vegetation Community Salinity

WORK IN PROGRESS:

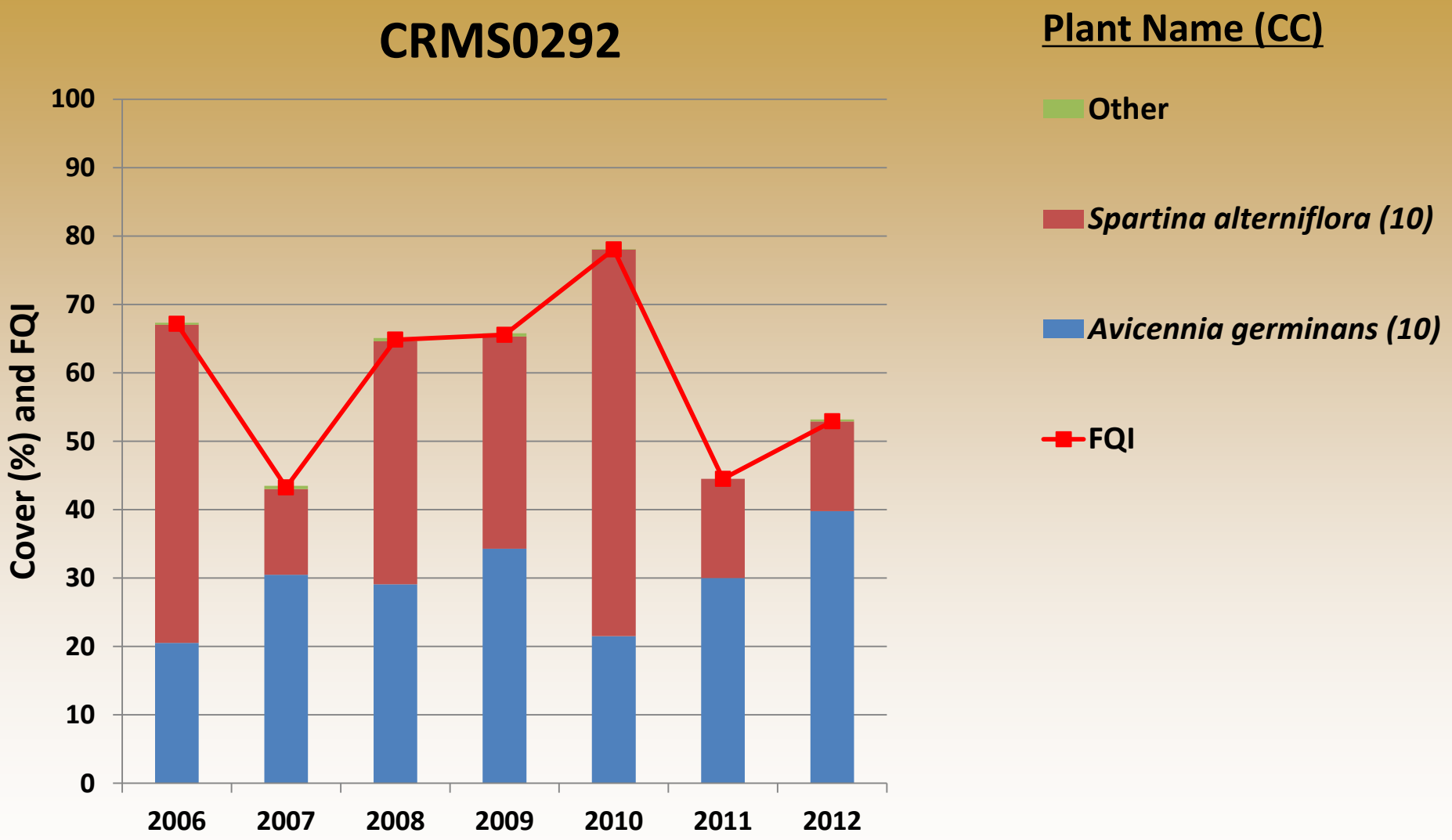
- **Species specific salinity values were calculated as the weighted average of species cover and median growing season salinity for all observations coastwide.**
- **Then VCS was calculated using the weighted average of cover and species salinity by site per year.**
- **VCS can be plotted at the site (project or unit) level to visualize trends in how vegetation responds to shifts in salinity.**
- **Could provide additional information for the vegetation tab but wouldn't be scaled from 0 to 100 and incorporated into the report card.**
- **Using the robust dataset we could refine the salinity ranges that define the major vegetation classifications.**



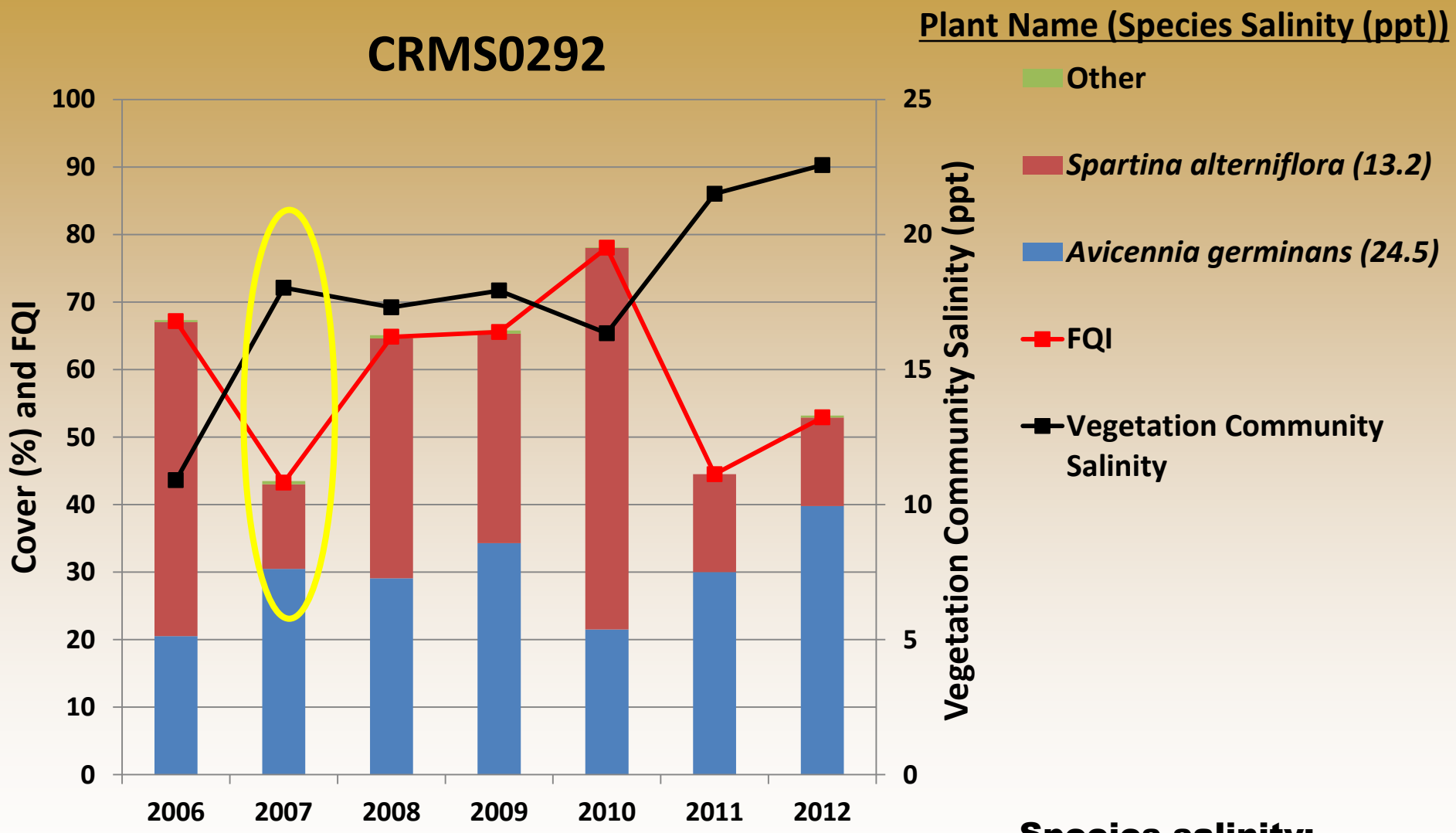




Vegetation Community Salinity

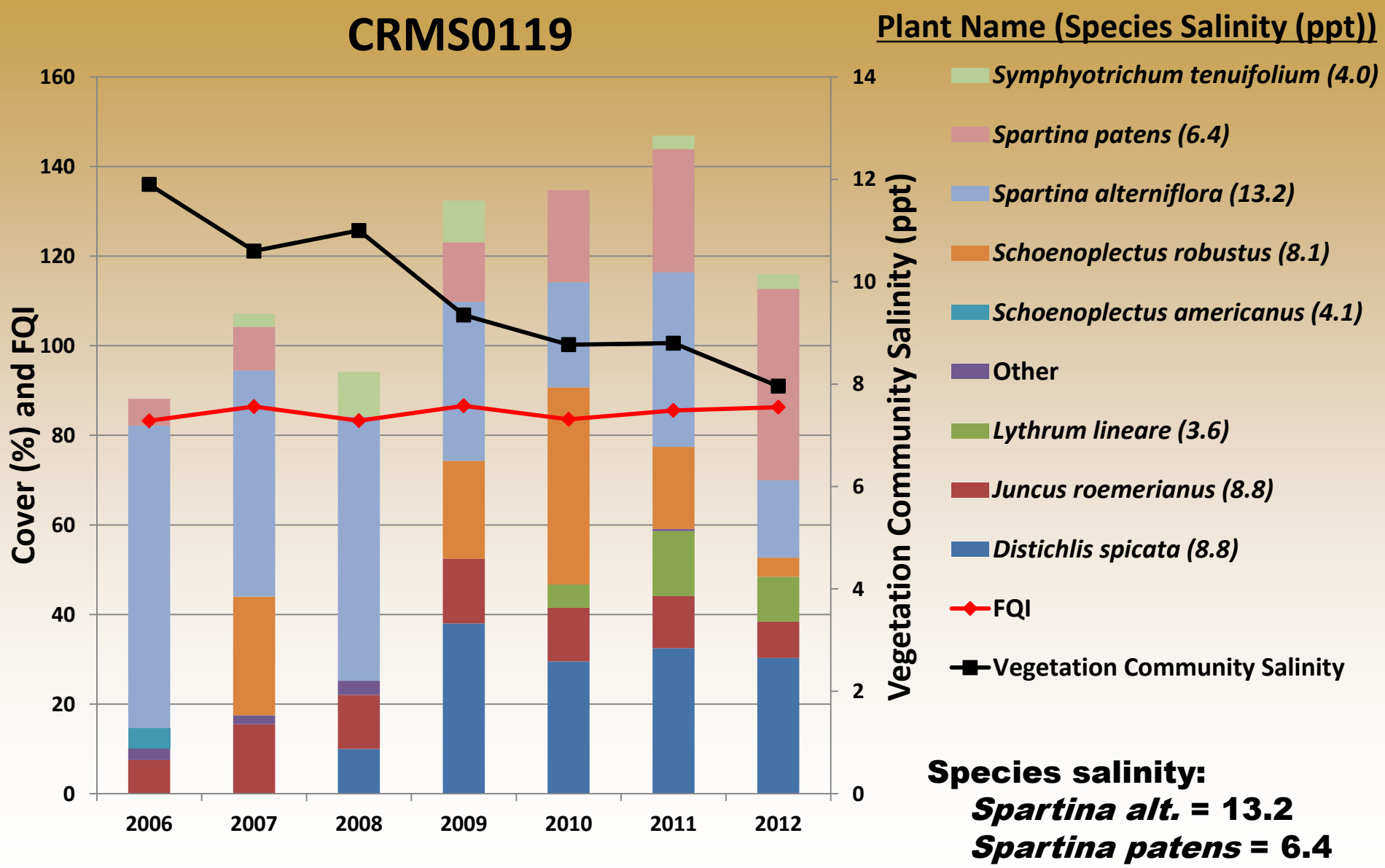


Vegetation Community Salinity



Species salinity:
Mangrove = 24.5
***Spartina alt.* = 13.2**

Vegetation Community Salinity



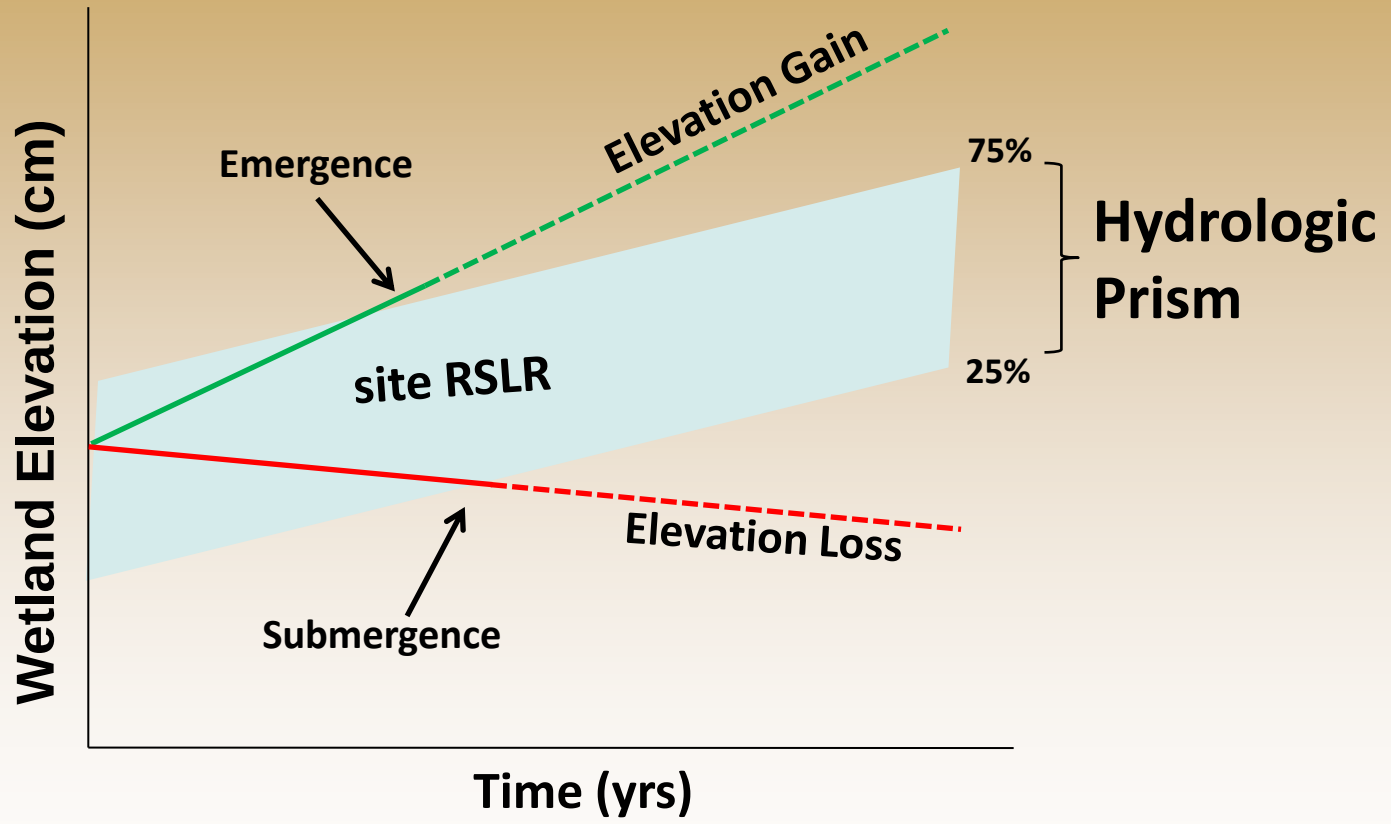
Species salinity:

***Spartina alt.* = 13.2**

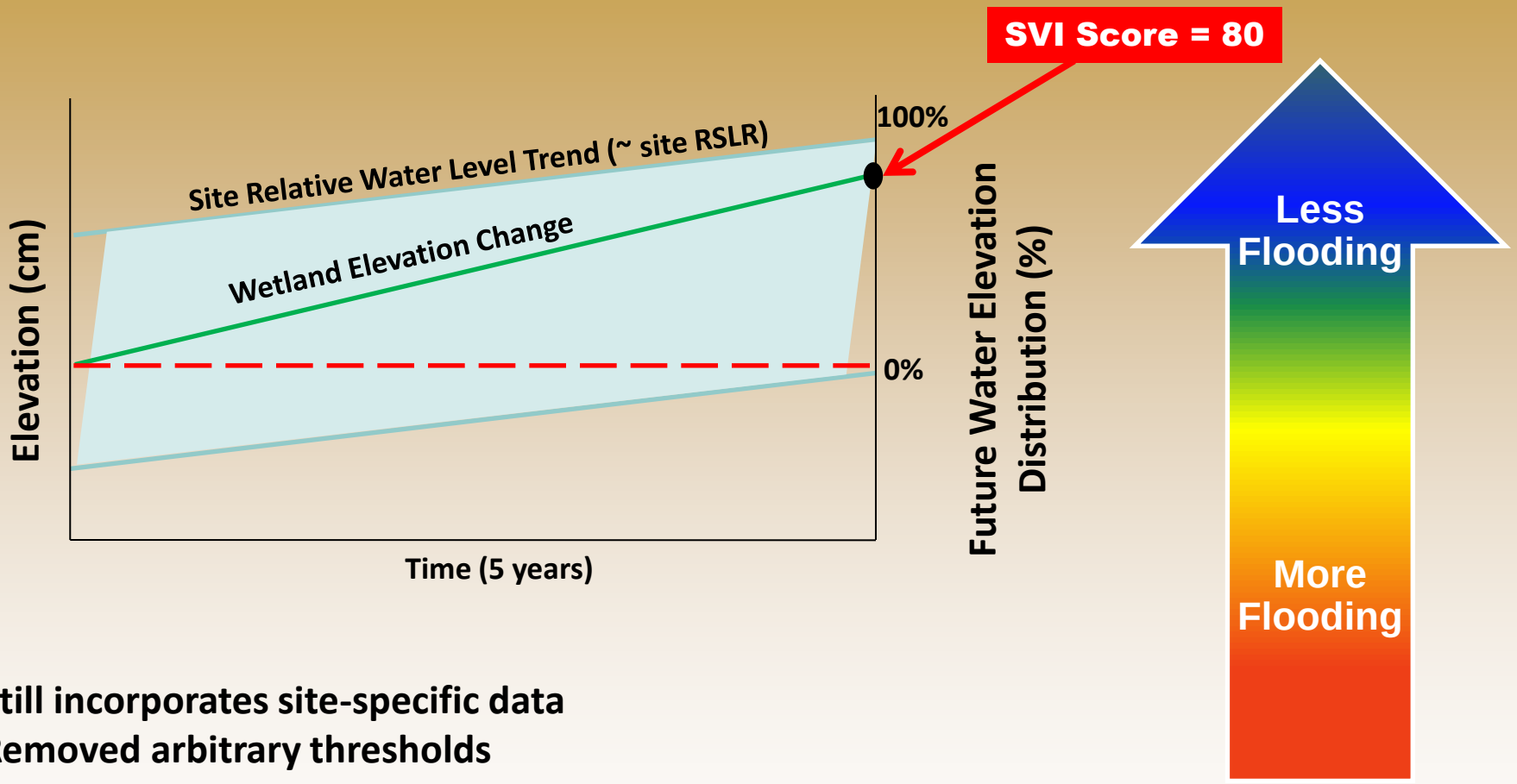
***Spartina patens* = 6.4**

Revision to the SVI

Initial Submergence Vulnerability Index



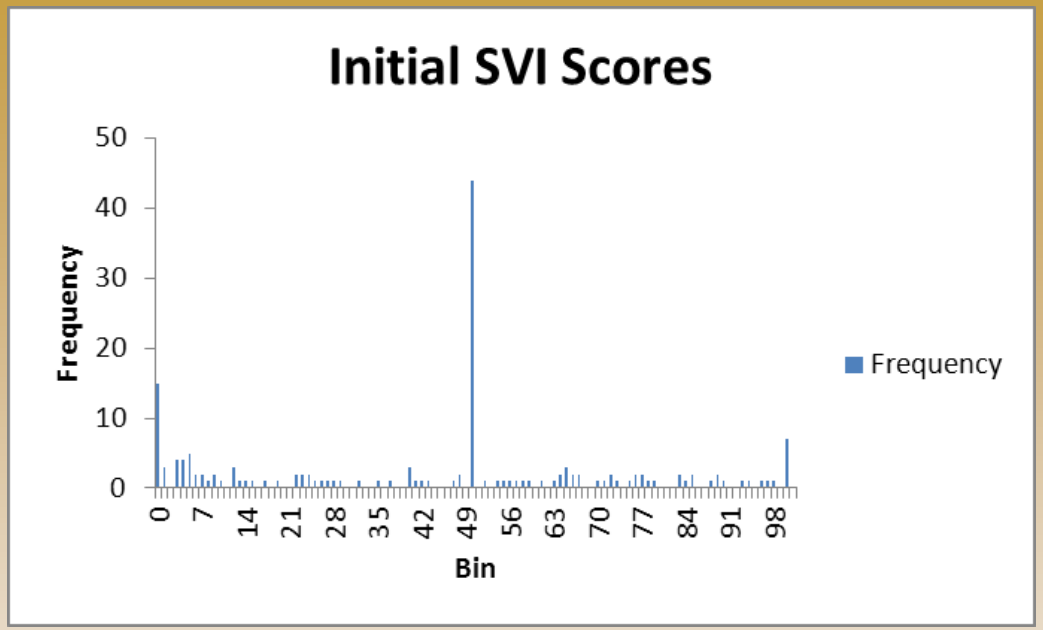
Revised Submergence Vulnerability Index

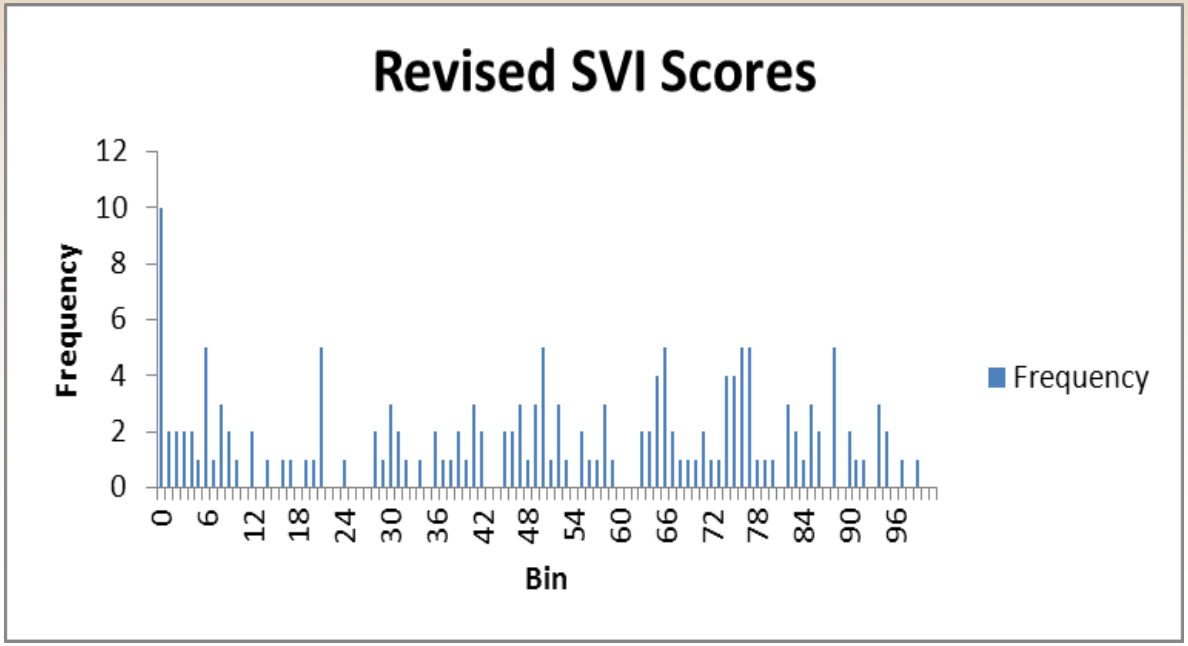


- Still incorporates site-specific data
- Removed arbitrary thresholds
- Decreased projection time to 5 years
- Redefined site-RSLR as:

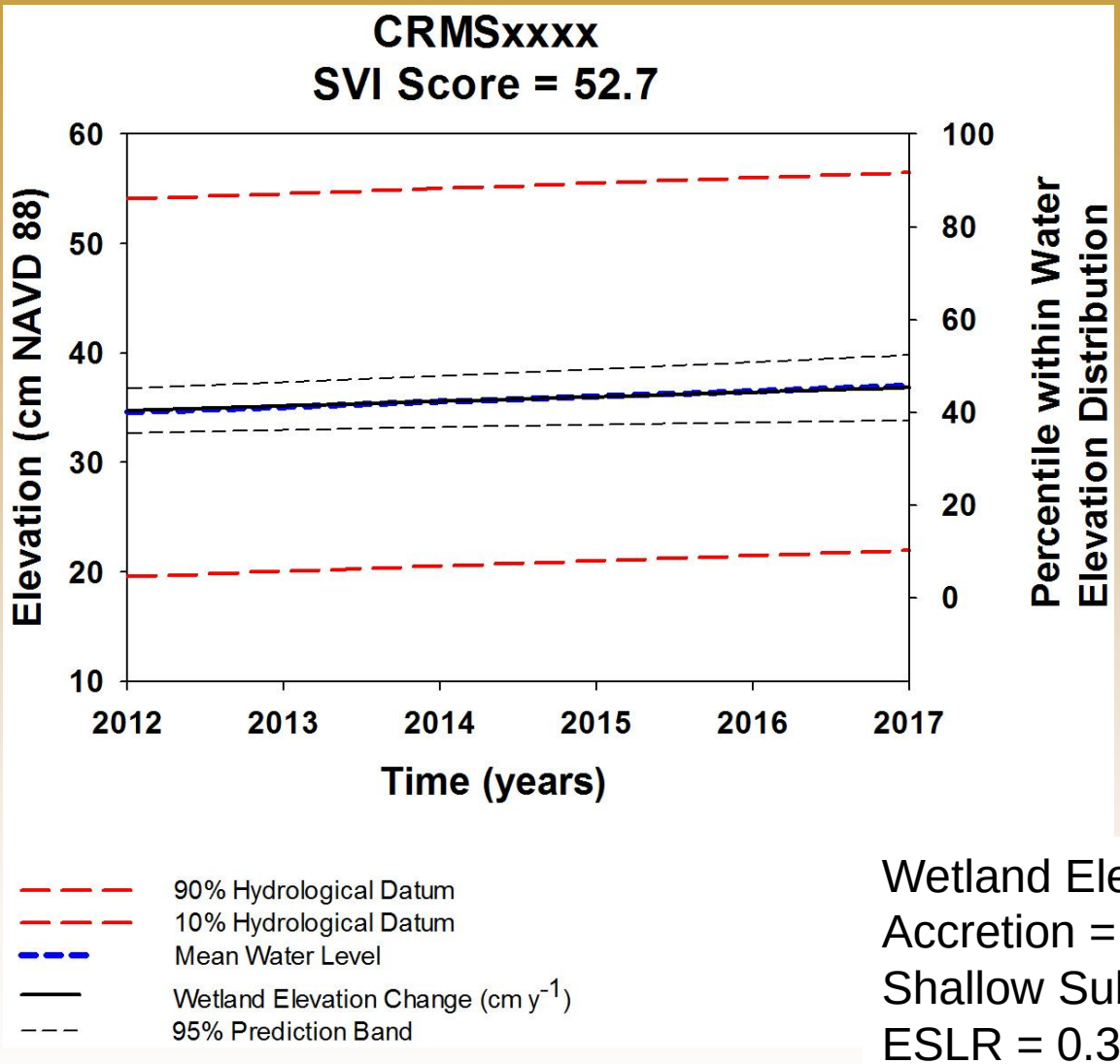
  Site Relative Water Level Trend = Shallow Subsidence (accretion-elevation change)+ESLR
- Higher scores are flooded less and less vulnerable to submergence

Revised SVI – Score Distributions



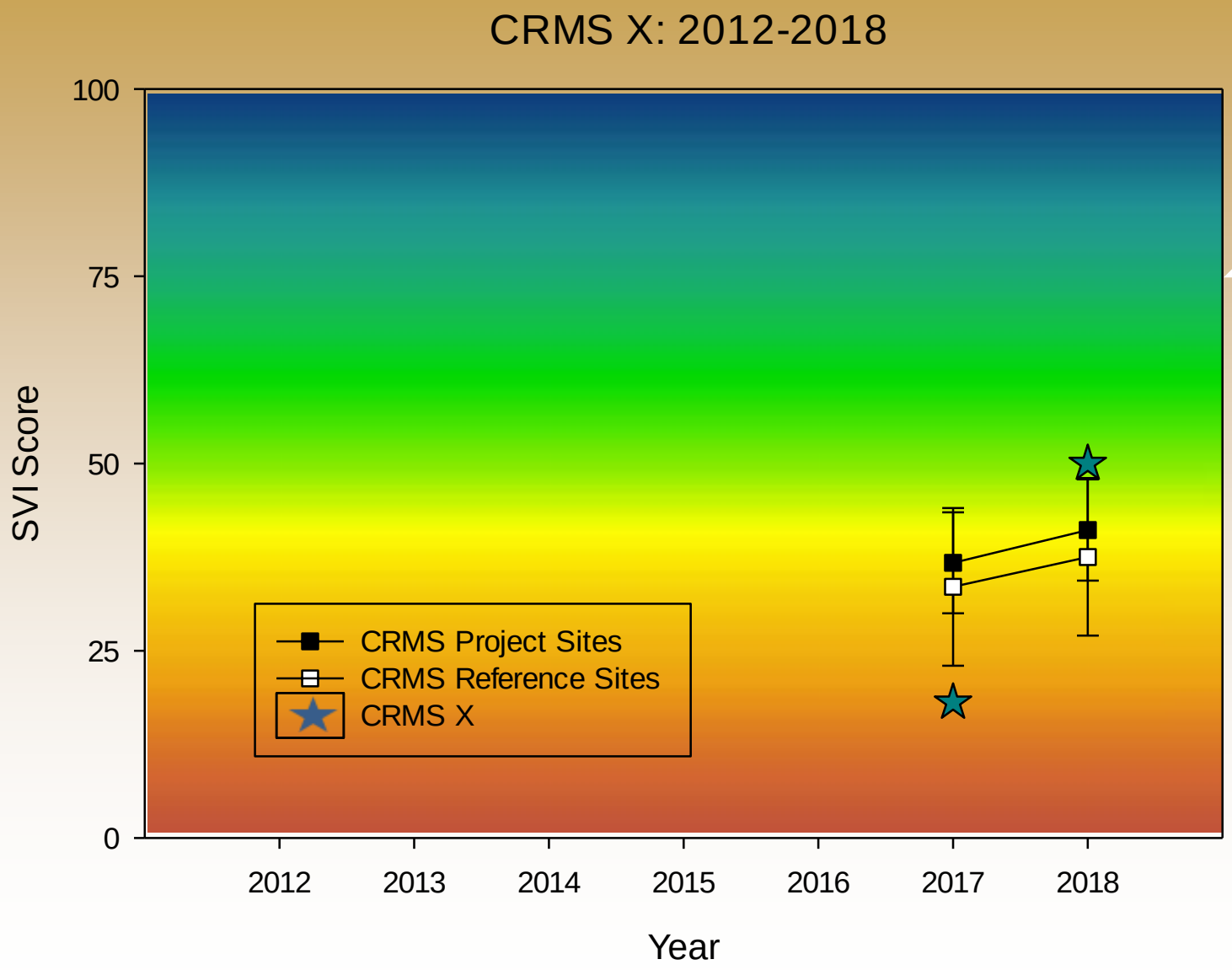


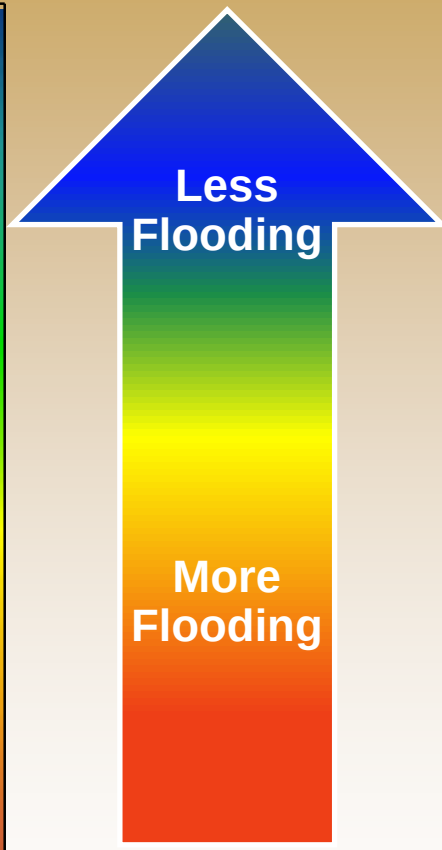
Revised SVI – Site Scale



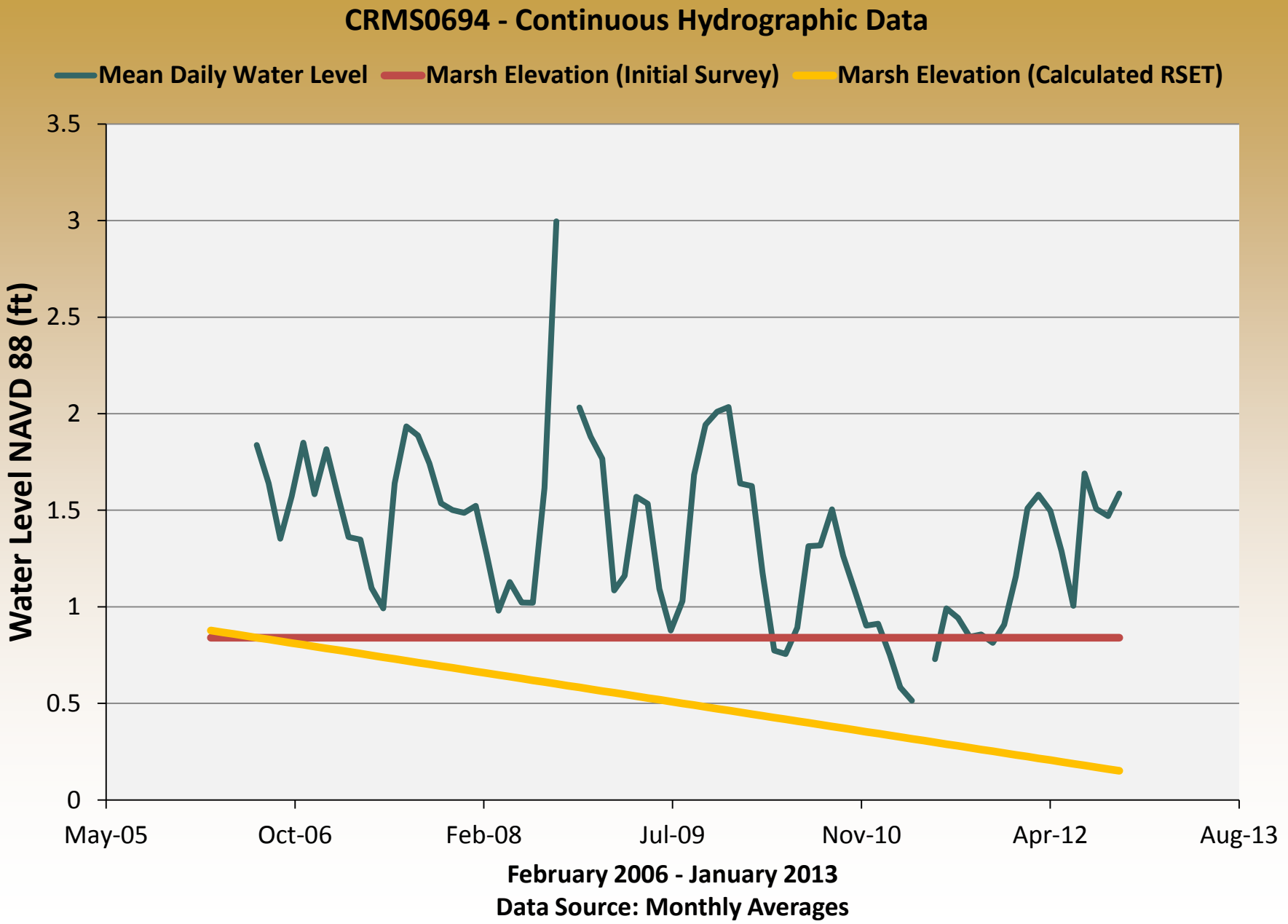
Wetland Elevation Change = 0.42 cm y^{-1}
Accretion = 0.59 cm y^{-1}
Shallow Subsidence = 0.17 cm y^{-1}
ESLR = 0.31 cm y^{-1}
Site Relative Water Level Trend = 0.48 cm y^{-1}
SVI Score = 52.7

Revised SVI – Project Scale





Calculated Marsh Elevation



CRMS Analytical Future Direction

The analytical teams will meet with the MWG to present recommendations for additional metrics and future data manipulations.

The report card continues to be a work in progress and the indices will be refined as the datasets become more robust, new information becomes available, or needs change.

Analytical teams are working to present tools and products that best suit the CWWPRA community.

With the completion of the Master Plan, the Landscape Team will be evaluating options for a landscape index.

Questions??

As always your feedback, suggestions, and comments are what help move the development of the website and analytical teams forward.

piazzas@usgs.gov